VOL. XXIII NEW YORK—THURSDAY, AUGUST 11, 1910—CHICAGO No. 6

THE AUTOMOBILE

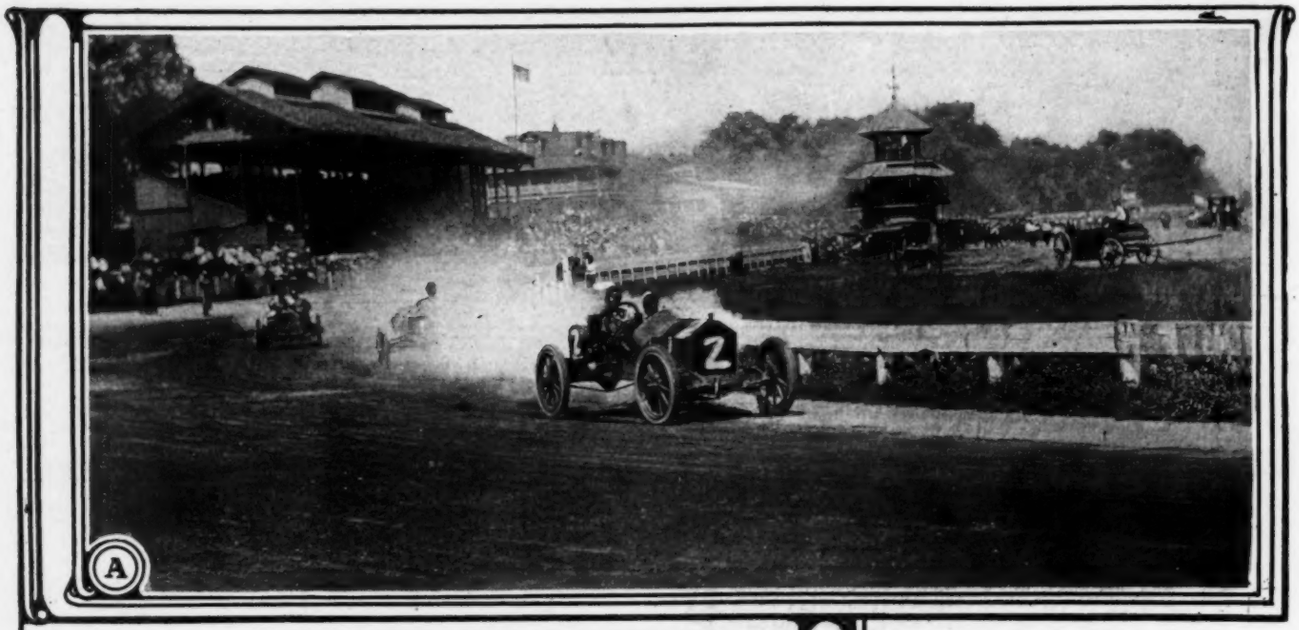
Q. C. M. C. Midsummer Meet

CRACK PHILADELPHIA ORGANIZATION PROMOTES THE MOST SUCCESSFUL AFFAIR IN ITS HISTORY BEFORE A RECORD-BREAKING CROWD.

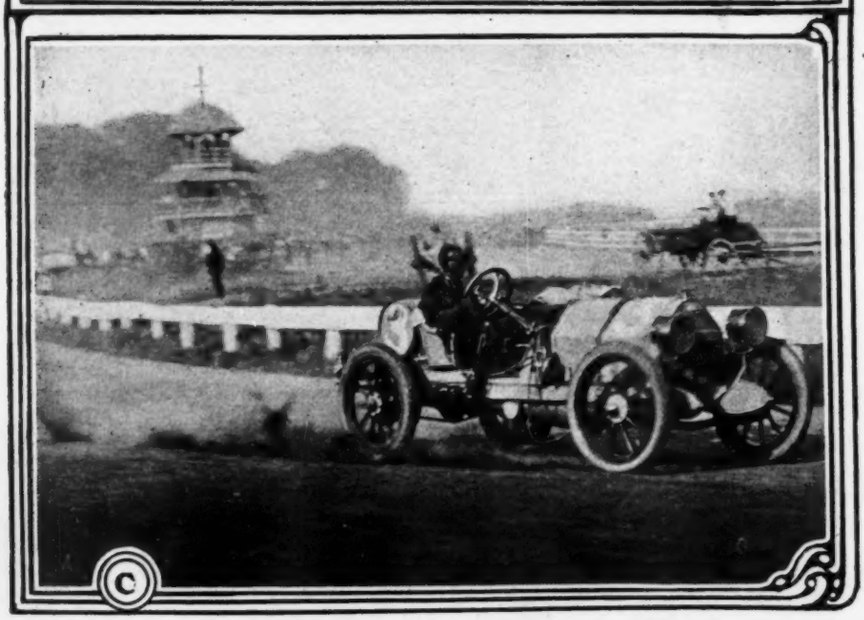
PHILADELPHIA, Aug. 8—That this city is not yet prepared to abandon automobile track racing was demonstrated on Saturday afternoon, when, at the midsummer meet of the Quaker City Motor Club, the crowd of upwards of 10,000 not only packed the stands, hotel porches and paddock at Point Breeze track, but a contingent of thousands more broke down the fence along the back-stretch and swarmed into the inclosure despite the efforts of a large force of policemen.

The six-hour race was the big event of the day. Seven cars started; Knox, B. Oldfield; Kline-Kar, W. D. Morton; Darracq, B. Kerscher; Ford, F. Kulick; Pullman, H. Ringler; Selden, C. Young, and Chalmers "40," C. Howard. Getting off to a good start the drivers settled down for the long grind. Kerscher, in the Darracq, jumped to the front, but was forced to relinquish the lead shortly to the Knox, which forged ahead and at the end of the first hour had twice lapped the Darracq, the runner-up. The Pullman had hard luck throughout the contest, having to leave the track several times, starting with the very first lap, when it threw a rear tire. At the end of the second hour the Knox was seven miles ahead of the Kline-Kar, which had usurped the Darracq's place as contender, engine trouble shortly after causing the latter to withdraw. At the end of the fourth hour the Knox had a lead of 12 miles and it was only a question as to how many miles the car would make. In the fifth hour a very pretty race developed between the Kline-Kar and the Ford for second place. So fiercely was it fought out that at the end of the hour each car had covered 209 miles. Minor troubles developing, however, caused the Ford to lose ground in the last hour. At the end of the race the Knox had completed 261 miles, Kline-Kar, second, 245; Ford, third, 226; the Chalmers "40", fourth, 218, and the Selden, fifth, 167.

VIEW OF THE STRETCH, SHOWING THE MERCER WINNING ITS MATCH RACE WITH THE OTTO



A—Ringler's Pullman leading in the 450-and-under event



B—Pullman-Ringler combination—two-time winner
C—The Kline-Kar which finished second in six-hour race

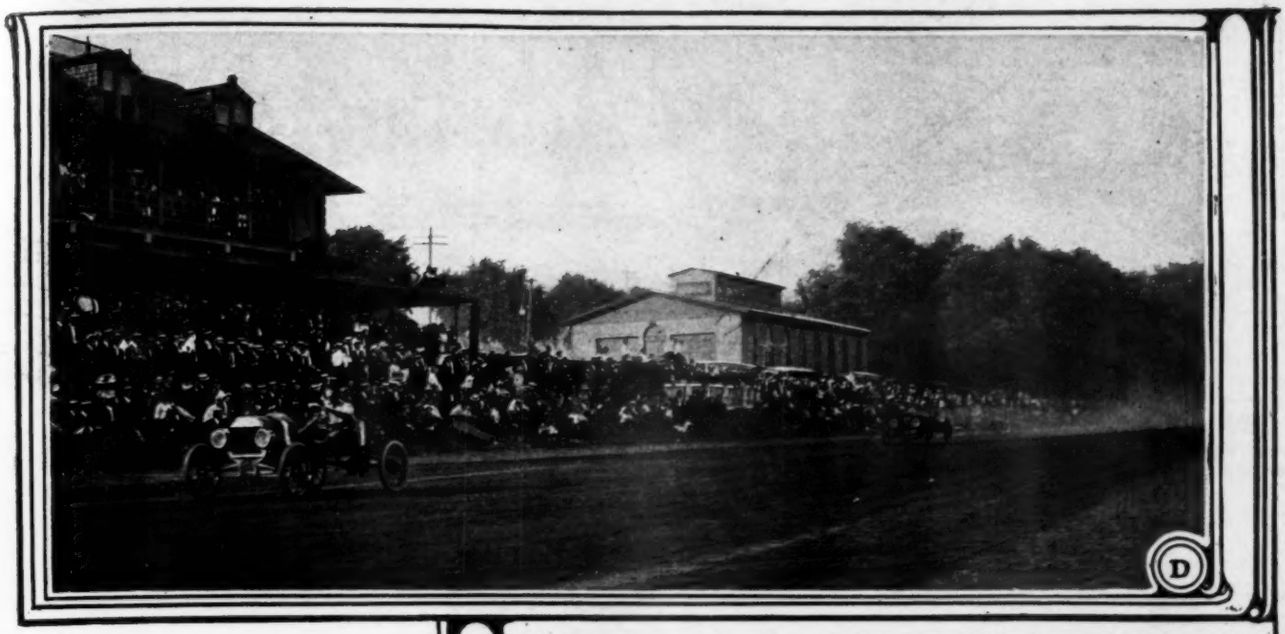
The real feature of the meet was the performance of Harvey Ringler, an amateur driving a Pullman. He not only won the 161-300 cubic inch and the 450-and-under event for Class C cars, but his time in the latter was the best for the distance made during the meet—11:30 flat. The Pullman also started in the 750-and-under event, in which it came in third, and in the six-hour race, from which it was withdrawn owing to cylinder trouble.

The time trials were only partially successful, for while the Knox clipped 1 2-5 seconds off the previous best mile track record after two trials, the Darracq's attempt to lower the five-mile figures—5:13—was unsuccessful by a margin of 8 1-5 seconds.

The first race run off was a match race for blood between a Mercer driven by J. Sherwood and G. H. Jones' Otto. The latter had the misfortune to throw a tire on the very first lap and before he could get going again his opponent had opened up a seven-lap lead, finally crossing the tape by that margin in 12:28 2-5.

Everybody picked the Ford-Kulick combination to win the 161-300 cubic inch 10-mile event, but the Pullman, driven by Harvey Ringler, the clever amateur, assumed the lead about the third mile, adding to its advantage with every lap to the finish, flashing under the wire in 11:33 2-5, with the Ford 300 yards behind the Otto, which captured the place.

In the 450-and-under Class C event at ten miles, C. C. Fairman's Kline-Kar being an added starter, the Pullman repeated, this time beating the Ford by a full half mile in the best ten-mile time of the day—11:30. The Kline-Kar and



D—Crowd encroaching on track in six-hour race—Ford leading Pullman

the Otto were lapped by the leaders on the seventh mile and dropped out.

In the 750-and-under race, in which the Pullman, Kline-Kar, Darracq and Knox were the starters, the latter went to the front at the gun and was never headed, winning by the small margin of one-fourth of a second from the Darracq, which led the Pullman by nearly a mile, the Kline-Kar dropping out at the sixth mile with tire trouble.

The timing and scoring arrangements were the best ever seen here, Paul B. Huyette, official timer, having inaugurated a new system which worked perfectly. In the six-hour race the laps were scored with the aid of a battery of seven odometers—one for each entrant—and at each mile the time was set forth on a score-board in black figures on white cards. The summaries:

MATCH RACE, 10 MILES

No.	Car	Driver	Time
1	Mercer	J. Sherwood	12:28 2-5
2	Otto	G. H. Jones	Did not fin.

10 MILES, 161 TO 300 CU. IN.

1	Pullman	Harvey Ringler	11:33 2-5
2	Otto	G. H. Jones	12:12
3	Ford	Frank Kulick	12:14 4-5

10 MILES, 451 CU. IN. AND UNDER

1	Pullman	Harvey Ringler	11:30
2	Ford	Frank Kulick	12:10
3	Kline-Kar	C. C. Fairman	Did not fin.
4	Otto	G. H. Jones	Did not fin.

10 MILES, 750 CU. IN AND UNDER

1	Knox	Oldfield ..	11:34 4-5
2	Darracq	Ben Kerscher	11:35
3	Pullman	Harvey Ringler	13:30 3-5
4	Kline-Kar	C. C. Fairman	Did not fin.

MILE FOR TRACK RECORD (1:01)

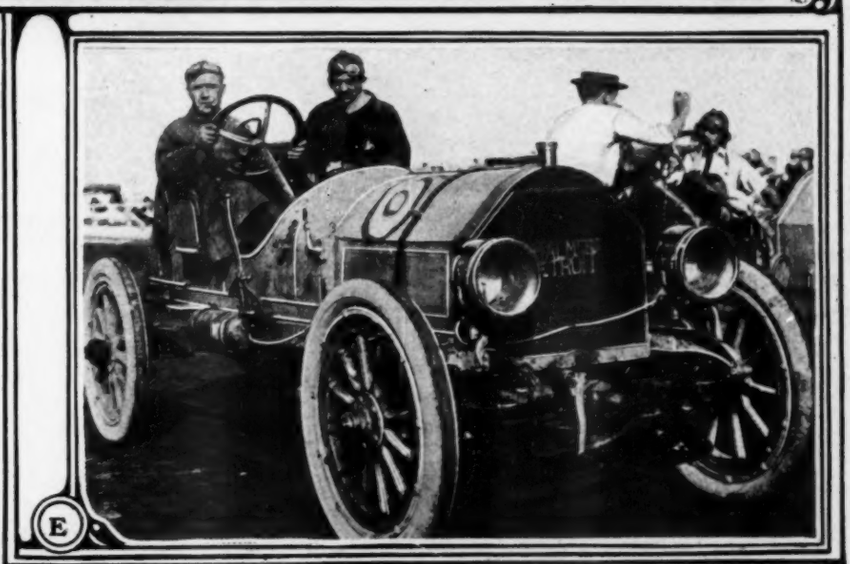
1	Benz	Oldfield	1:00
	Benz	Oldfield	:59 3-5

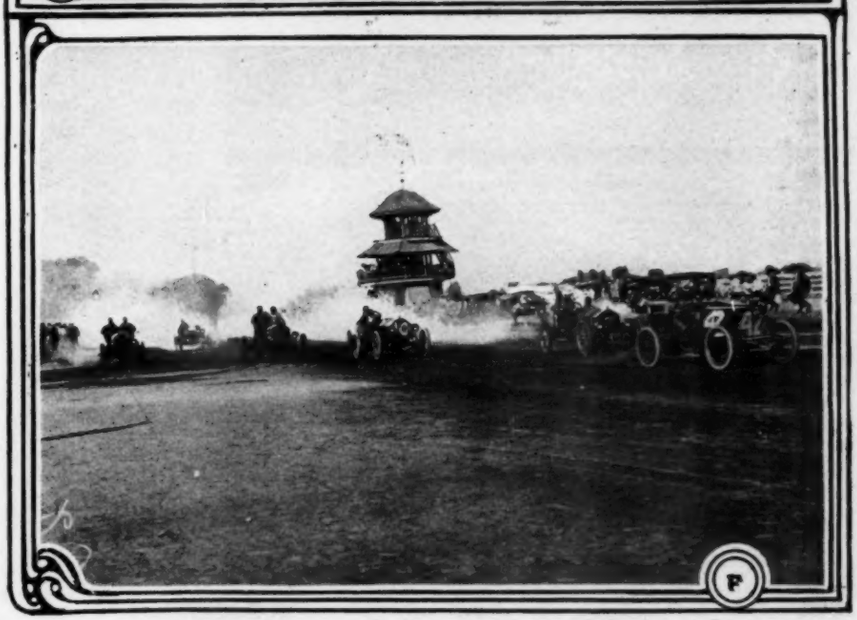
FIVE-MILE FOR TRACK RECORD (5:13)

1	Darracq	Ben Kerscher	5:21 1-5

SIX-HOUR ENDURANCE RACE

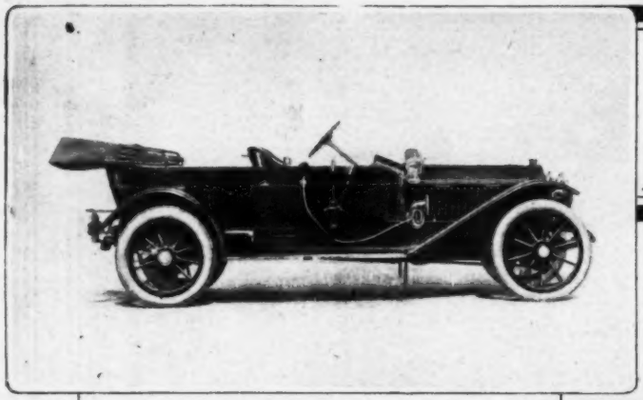
No.	Car	Driver	Distance Miles
1	Knox	Oldfield	261
2	Kline-Kar	W. D. Morton	245
3	Ford	Frank Kulick	226
4	Chalmers	Chas. Howard	218
5	Selden	Chas. Youngs	167
6	Darracq	Ben Kerscher	Retired
7	Pullman	Harvey Ringler	Retired



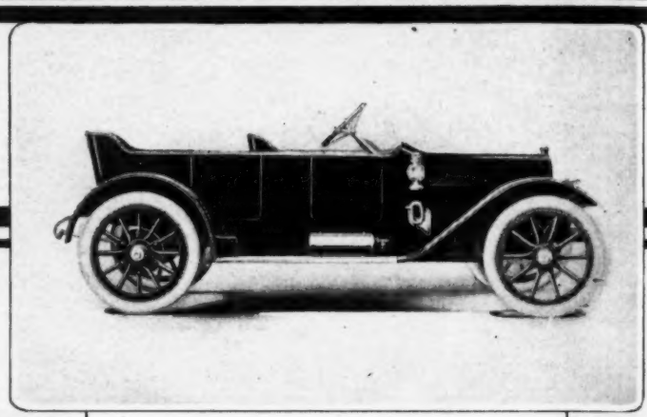


E—Chalmers-Detroit "40" driven by Charlie Howard, fourth in the six-hour race
F—Seven cars started in the six-hour event, five of them finishing

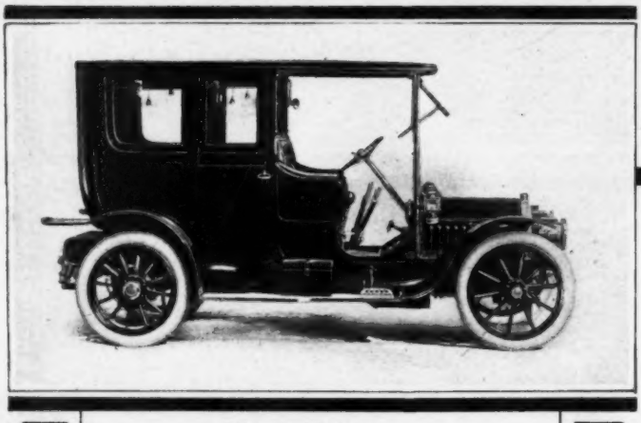
Advanced Types



Peerless Torpedo



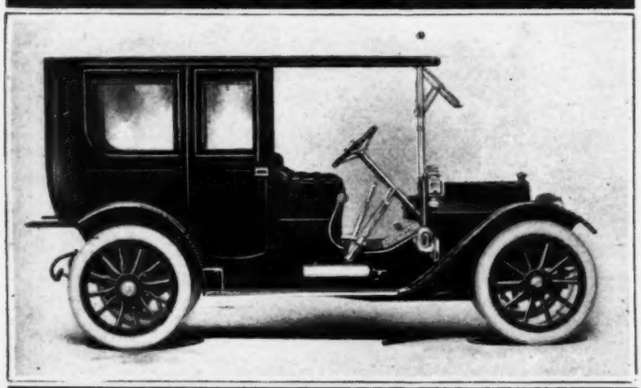
Chalmers "40" Torpedo



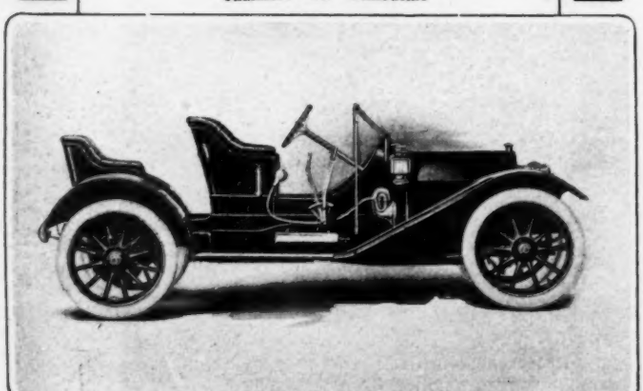
Peerless Limousine

Some 1911 Automobiles

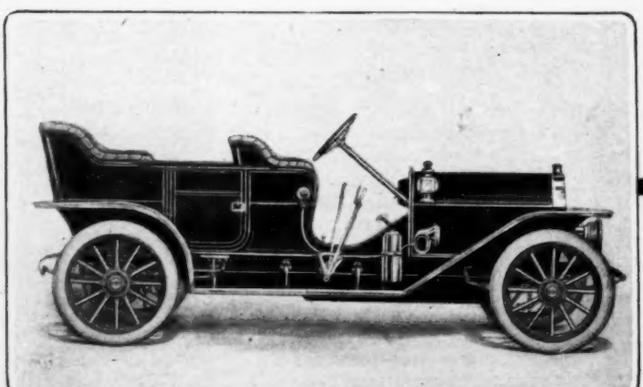
VETERAN autoists, especially those who make it a practice to have a new automobile every year, find themselves somewhat at a loss this season, due to the fact that they are not offered a wide opportunity to ascertain with any degree of certainty just what the 1911 cars will be like. This is as it should be, and the probabilities are that it is only a matter of two or three years at the most when the "annuals" will disappear so that when a good automobile is selected by a purchaser it will remain good until it is worn out in the regular way. The idea that an automobile, like a costume from Worth, should cease to be of value because the season changes, is perfectly absurd, and it is believed that the new designs of bodies, some of which are presented here for the first time, are sufficiently standardized and so well along stable lines that an autoist will scarcely have to buy a new car next year simply because it may be next year, or because a change in body work was found to be necessary on the ground of imperfections in the earlier effort. Past practice, with its rapid-fire variations, frequently hid serious defects under a



Chalmers "30" Limousine

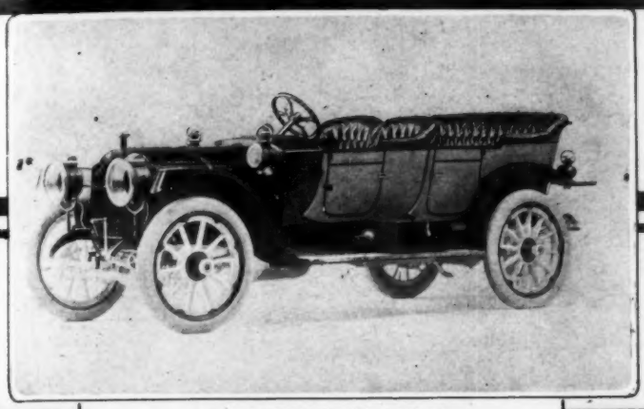


Chalmers "30" Roadster

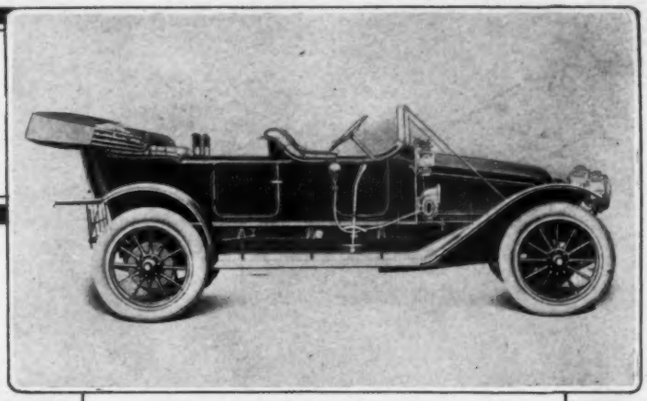


Inter-State Touring Body

of 1911 Bodies

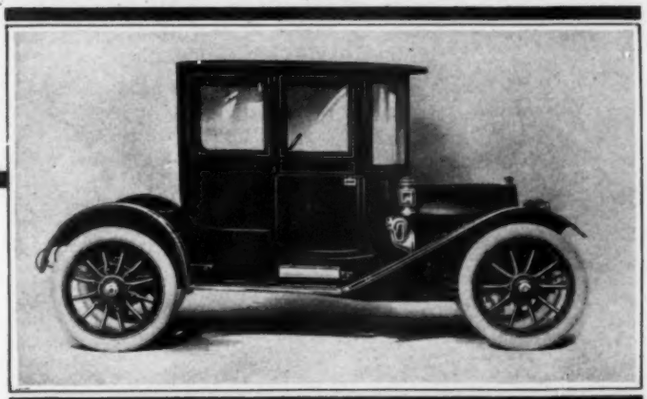


Packard "30" Fore-Door Phaeton



Franklin Model H Open Body Touring Car

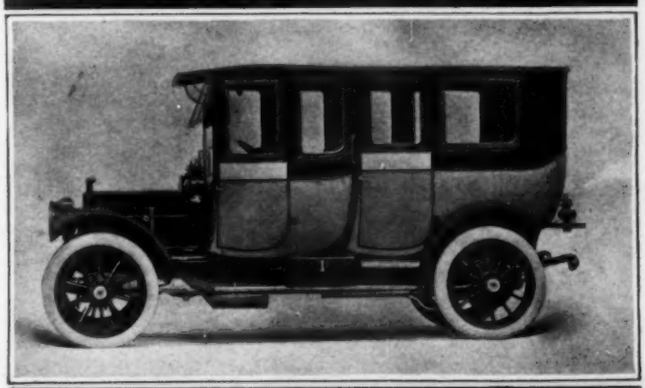
DISCUSSING SUCH MAKES AS PEERLESS, PACKARD, CHALMERS, INTER-STATE, AND FRANKLIN, FROM THE BODY AND POWER PLANT POINT OF VIEW, DEPICTING THE TREND



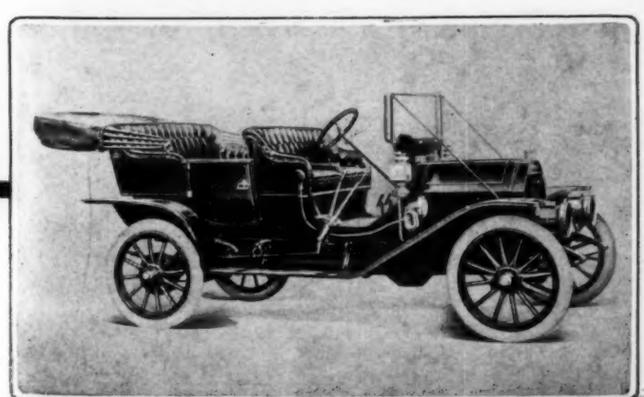
Chalmers "30" Coupe with Inside Control

guise of a change in style, for the sake of style, conveniently forgetting that there was a grave necessity at the bottom of it all.

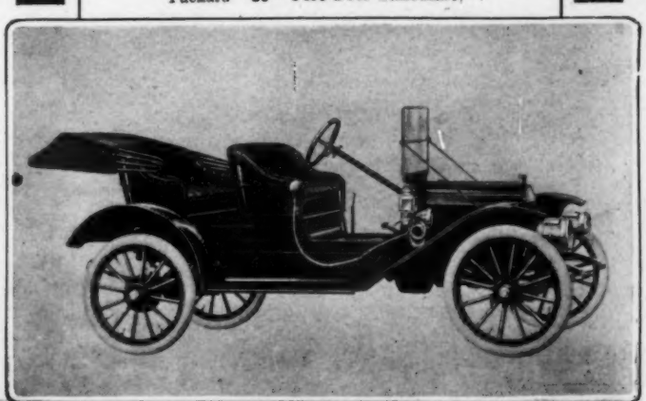
It is believed that the supporters of the industry have always laid too much stress upon questions of appearance, and failed in many cases to grasp the significance of quality from the point of view of the mechanism. As an illustration of what not to do when it comes to buying automobiles, a $3,000 body is scarcely a fitting crown for a $1,300 chassis. This may be an apparently far-fetched presentation of an absurd situation, but such things have happened in the past. In looking over the bodies of the several makes as here presented, it will be observed that they are in better taste than formerly. The cost of the body work is commensurate with the chassis, and a better adjustment of the relating costs will be found. This may not seem to be a sufficiently important point to draw out a protracted discussion, but as the history of the automobile is written, it represents far more than surface indications would seem to show. The evolution of the automobile represents a long struggle with the mechanical phase of the situa-



Packard "30" Fore-Door Limousine

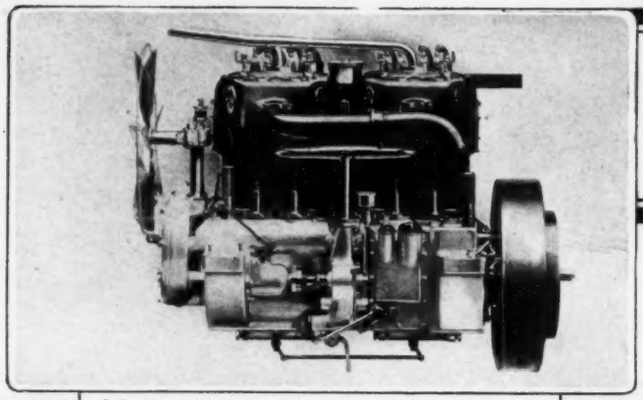


E.M.F. "30" Touring Body with Top and Windshield

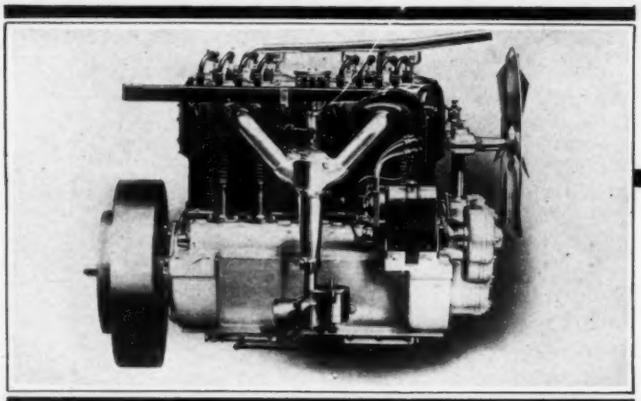


Flanders "20" Suburban

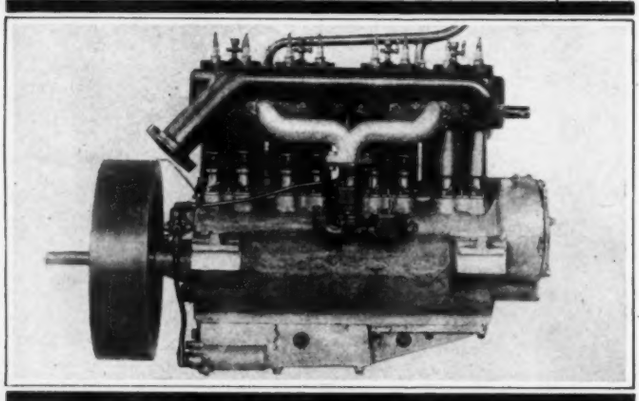
Depicting 1911 Fo



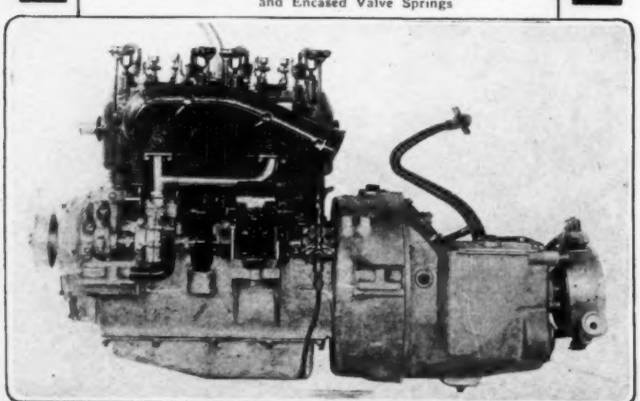
Left side of the Peerless Motor, showing the Water Pump and Method of Driving



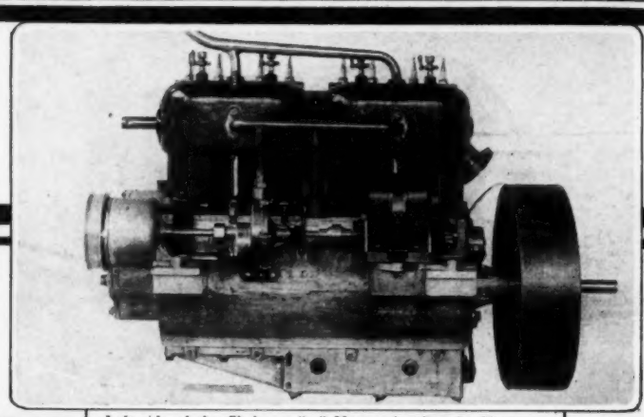
Right side of the Peerless Motor, showing Carbureter Installation and Magneto in Place



Right side of the Chalmers "40" Motor, showing the Carbureter and Encased Valve Springs



Left side of the Chalmers "30" Motor, showing the Magneto, Oil Connections and Water Pump



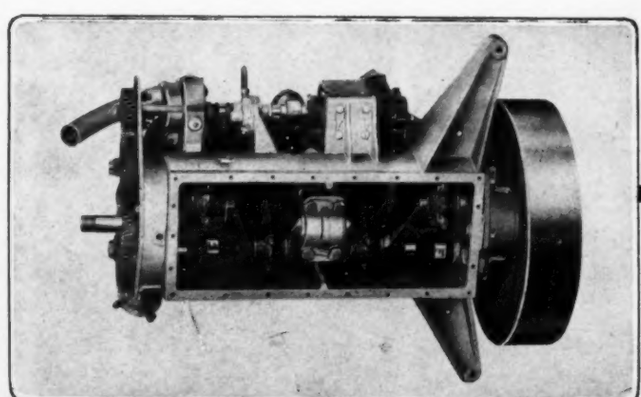
Left side of the Chalmers "40" Motor, showing the Magneto, Method of Driving, and Water Pump

tion, and a slow but sure series of modifications of body work, they being the result of mechanical changes. Originally, bodies were mere adaptations of those in common use on horse-drawn vehicles, employed, perhaps, because of the designers' lack of experience. In time the body situation modified, and for 1911 we have the enclosed types of bodies, some along torpedo lines, others conforming to gunboat styles, but all suggesting the presence of a machine, rather than a relation to the old "rig."

If it may be taken for granted that the enclosed form of body simplifying the torpedo or the gunboat idea is taking root, and indicating that it is a permanent institution, the fact remains that limousine types are being perfected and amplified. The illustrations given with this article of enclosed types of bodies represent the best interpretation of the creative genius of the pure artist, coupled with the strength which comes by taking advantage of the designing ability of a trained engineer, advanced a step through the handiwork of the artisan, and brought to finality by depth and scope of finish, calling into play appropriateness in the selection of groundwork and color, beyond the dream of the carriage maker at his best, and in the fullest conformity with the exigencies of automobile service.

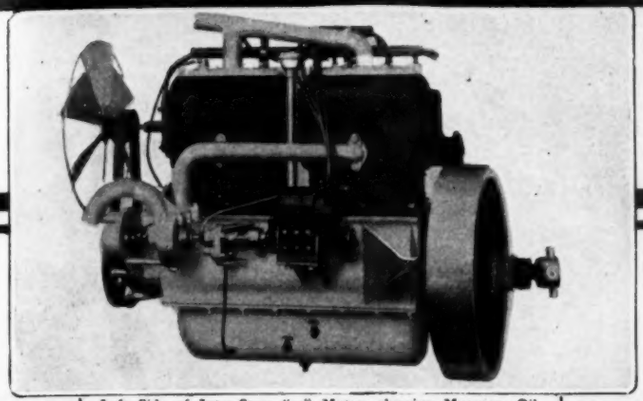
Mechanical Refinements in the Finer Sense Only

Taking the Peerless 1911 power plant with a view to comparing 1910 with 1911, the new line as announced includes three dis-



Looking Into the Inter-State Motor at the Crankshaft, Main Bearings, and Camshaft

rms of Motors

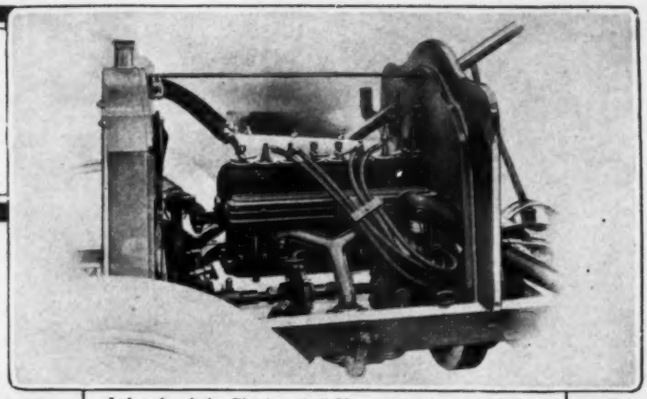


Left Side of Inter-State "30" Motor, showing Magneto, Oil, and Water Pump

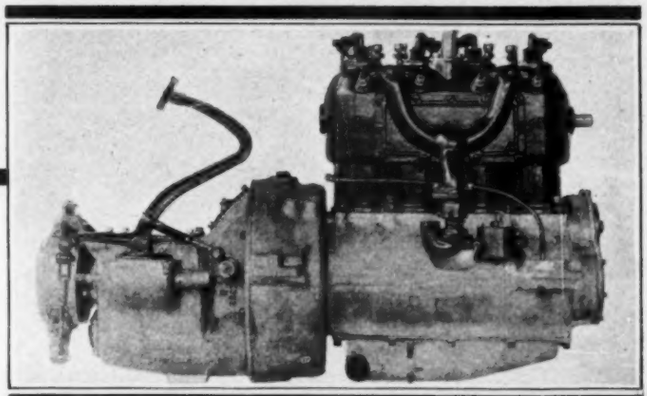
tinct models as follows: Model 31 with a 30-horsepower, four-cylinder motor, having a 5-inch bore and 5-inch stroke; Model 32 with a 50-horsepower, six-cylinder motor, with a bore of 5 inches and stroke of 5 1-2 inches, and Model 29 with a 20-horsepower, four-cylinder motor, with a bore of 4 inches and stroke of 4 5-8 inches. As an indication of the flexibility of the plan considered by the Peerless Motor Car Company, of Cleveland, Ohio, ten distinct types of bodies are regularly available for the three types of chassis. It has been the claim of this company all along that it aimed at standardization and avoided to the greatest possible extent the introduction of glaring innovations, so that it will come as no surprise when it is said that beyond making such refinements as a year's experience might properly suggest, the 1911 product is substantially the same as for 1910.

Taking up the refinements of the year, the most important one, perhaps, comes in the form of an air compressor pump for inflating tires. This pump is a prototype of a four-cylinder automobile motor, and is secured to the front end of the gearset under the front deck-boards. It is driven by an extension of the lay shaft of the gearset. In order that the pump may be thrown into gear at will, a suitable clutch is interposed. Air is conducted from the pump through brass tubing, terminating in a coil of hose of sufficient length to facilitate the work, and the clutch for the air pump is operated by means of a rod and lever which extends through the side member of the frame at a convenient

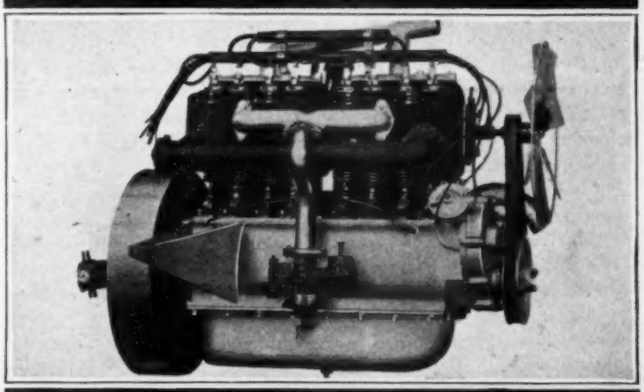
(*Continued on page 247.*)



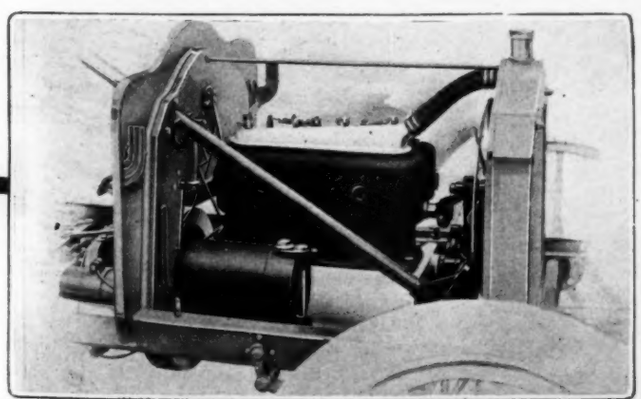
Left side of the Flanders "20" Motor Nested in the Chassis, Looking at the Magneto, Carbureter, and Centrifugal Pump



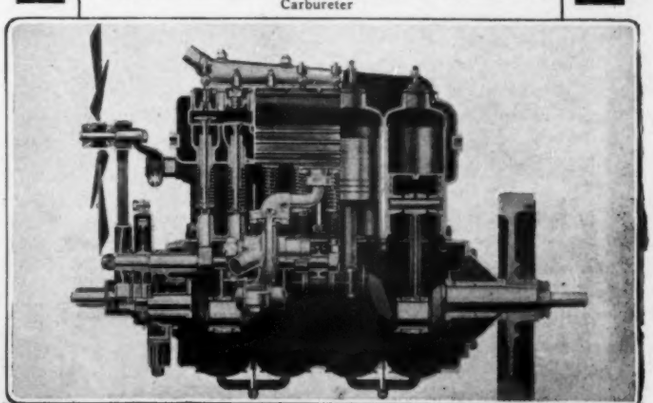
Right side of the Chalmers "30" Motor, showing the Carbureter, "Bloc" Cylinders, Transmission Gear, and Pedal



Right side of Inter State "30" Motor, presenting the Stromberg Carbureter



Right Side of Flanders "20" Motor Depicting the Water Connections and Other Nice Features of Design



Section of the Flanders "20" Motor with a 2-Bearing Crankshaft and Other Details besides the Centrifugal Pump

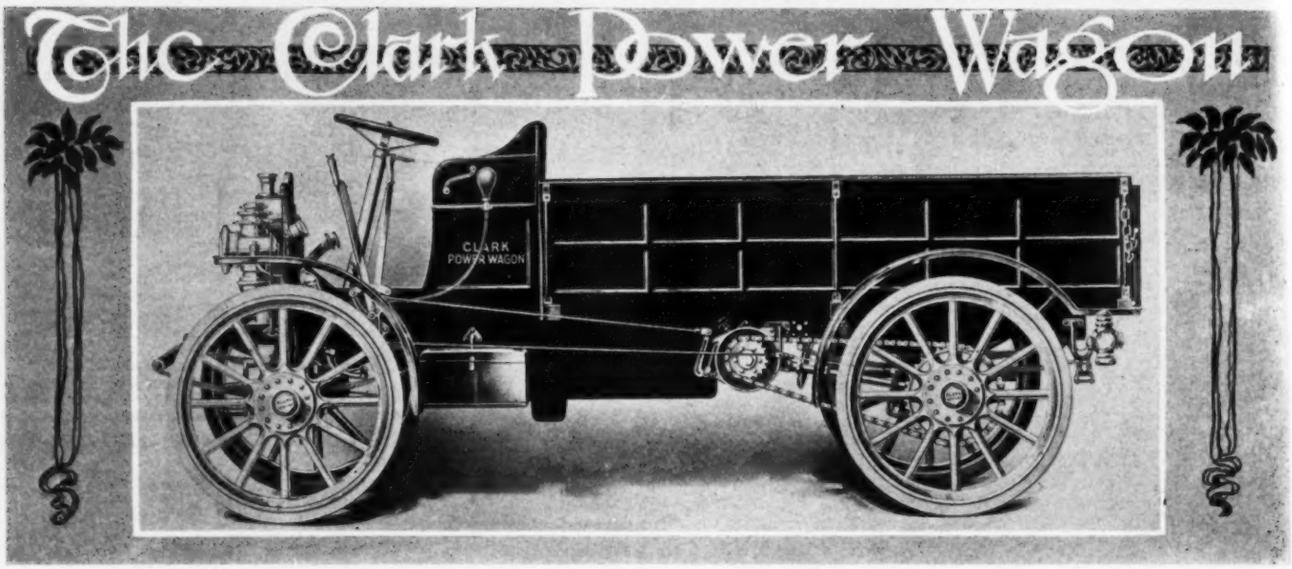


Fig. 1—The Clark Power Wagon, fully equipped and ready for service

LEADERS in the automobile field are rapidly reaching the conclusion that power wagons will ultimately become the mainstay of the industry, it being the case that "long hauls" are now made advantageously in this way and heavy inroads are being made in the "short haul" work. During the pioneer days of the commercial car the plan was more or less hampered by considerations which had nothing to do with the enterprise. The plants devoted to the manufacture of automobiles were so thoroughly engaged in the production of pleasure vehicles that there were no facilities left to be utilized in other work. In addition to lack of facilities the industry was confronted by a famine of technically trained men, and even the artisans were in numbers insufficient to supply the demand. Many attempts under the conditions in the direction of commercial car production were rendered futile, and the public at large reached the false conclusion that however good the automobile proved to be in pleasure pursuits, it was lacking in stamina.

It is no longer necessary to put any effort into persuading merchants that they must use the automobile for long hauls, and all that remains is to afford them the time in which to readjust conditions (one of which is to get rid of a circuit of horses), when short haul work will be taken care of through the medium of power wagons especially designed to successfully cope with the problems involved. It is recognized that the light delivery wagon, as it will have to meet competition, must be thoroughly good in every way, and its flexibility must be greater than that possible under ordinary conditions; moreover, the cost of maintenance will have to be kept down below that which seems to be true with improvised delivery wagons.

Encouragement is not hard to find if it is sought after in the quarters where it seems to reside in plenty; it is not in the path of wisdom to overlook the fact that with animal transportation the service is well organized and conditions of economy obtain at every point. Considering the service to be expected from power wagons, the conditions are not so fortunate. As a rule, the men who are devoted to the care and maintenance of animal-drawn vehicles are impressed into the other service when it is instituted, and in addition to a certain antipathy, due to their love for horses, there is the other side of the question involving not only lack of mechanical skill, but the probability of incapacity for acquiring a reasonable measure of the same.

The Clark Power Wagon Company, with a well-equipped manufacturing plant at Lansing, Mich., having spent many years in the manufacture of wagons in general, made it a point not to transfer its allegiance to power wagons until the time was ripe. It is a well-established fact, if not a principle, that an invention ahead of its time, however good it may be, sinks to the level of a common nuisance, and it was foreseen by the company that it could better afford to continue its regular line of work, supplying its clientèle as dictation required, studying the automobile situation in the meantime, hoping thereby to arrive at a wise and fitting conclusion, and after going over the matter at the greatest possible length two harmonious ideas took form: one was that the company had conducted a sufficient investigation to permit it to build a good power wagon, and the other takes into account the positive demand for wagons of this character.

It will be understood that the body work in the majority of cases must be contrived in view of the service to be rendered. Under the circumstances, the company devotes a part of its energies to the building of special bodies and is equipped to turn them out with great promptness after a fitting conclusion is reached in which the customer is consulted and is advised in the various ways. Fig. 1 depicts a standard form of the power wagon, a body which is much in vogue and may be had with or without a top. With the understanding that there is no limit to the types of bodies to be had for the asking, this phase of the situation will be subordinated to the mechanical side of the subject, which is of far more importance. Fig. 2 is a plan of the chassis showing a 2-cylinder motor of the opposed type located athwartships at a point on the chassis which brings the motor directly under the driver's seat. The radiator is located in front on the center line of the front axle, and independent water connections are made to the respective cylinders of the motor. The flywheel F1 is at the back of the motor, houses a cone clutch, and power is transmitted from the same through universal joints U1 to the transmission gear G1, thence to the jackshaft J1 with a bevel drive and differential gear enclosed. The jackshaft unit is self-contained, and is bolted up to the chassis frame, bringing the sprocket pinions S1 and S2 at a point well in front of the rear axle, but in line with the sprocket drums D1 and D2, which are bolted to the rear wheels, details being given elsewhere. The exhaust from the two cylinders of the motor passes back to the cross connections E1 and E2 to the muffler M1, bringing the same to the rear of the chassis frame and assuring that the exhaust will be cool, smokeless and noiseless, and affording the advantage of straight pipe connections without interfering with the play of the rear axle. The steering linkage L1 comes to the rear of the front axle, is protected thereby, and the link to the steering post is straight and long enough to avoid cranky steering action.

Main Points in the Power Plant Construction

The plan of the motor as shown in Fig. 3 presents the cylinder S1 with the water connection removed, showing the valve springs S2 and S3 and the tappet adjustments T1 and T2 with long guides G1 and G2 for the valve lifts V1 and V2, engaging the cams C1 and C2, which are integral with the camshaft which floats in bearings B1 and B2, taking power from a pinion on the crankshaft to the gear G3. The other cylinder S4 is shown in section, including the piston P1. There are four packing rings to maintain tight compression, one of them being below the gudgeon pin G4. The connecting rod C3 is of the I-section and has a long bearing on the gudgeon pin, which, together with other nice features of design, represents the foundation for the sanguine hopes of the designer. The flywheel F1 is relatively massive, this being an important matter in commercial work, and the magneto M1 is located at the other end, being driven by an extension from the camshaft through a universal joint U1.

Substantial Crankshaft Relied Upon for Service

Referring to Fig. 4, which is a side view of the motor in part section, the valve V1 is clearly brought out and the guide G1 is shown. All valves are of the bevel seat type, of the same size, and in diameter equal to half the diameter of the cylinders, thus assuring a full charge on each suction stroke, and exhaust free from back pressure, resulting in a well-established torquing moment and a full measure of power. The connecting rod C1 is shown completely in this view, and the halftime pinion P1 is shown in part indicating its relation to the halftime gear G2. The crankshaft C2 is a well-designed drop forging of special steel and the crank pin C3 is shown in section, indicating that the bearings are large, this being an extremely important detail in commercial service. Oiling is done positively by a pump P1 located in a well which is bolted up to the crankcase and the pump is driven by a vertical shaft S1, which takes power from the crankshaft. Among the other points worthy of mention are the symmetry of design, large water-jackets, uniform sections of metal at every point, castellated nuts with cotter pin locking, and just the refinements that are now standard with engineers of competence.

In order to fully appreciate the extent to which this motor has had the attention of the designer, it will be necessary to make a critical examination of Fig. 5, which is a longitudinal section in the plane of the crankshaft, presenting a substantial front main bearing M1 which may be removed by taking out the bolts B1, B2, etc., around the periphery, and if it is desired to remove the crankshaft, the same operation may be performed for the main bearing M2. The rear main bearing carries the weight of the flywheel F1, and is made relatively long and of greater diameter than the bearing M1. With the idea of inducing additional service security the method of oiling is looked after with the utmost care. The oil enters at O1, and after flooding the bearing, passes out under pressure to the slinger on the shaft S1, where it is thrown by centrifugal force to the cavity C1, whence it flows back through the channel C2 to the crankcase C3, thence to the oil-well O2. The method of driving the oil pump is clearly brought out in this section, showing a worm W1 driving the pump gear G1. The timer T1 is driven by a bevel set B3 taking power from the camshaft, and the magneto M3 is maintained in proper alignment, due to the accuracy with which the support S2 is machined. The clutch C4 is of large diameter, made of aluminum and dished, has a leather facing L1 with cork inserts C5. The clutch spring S3 is of large diameter, and housed in. An adjusting nut N1 permits of varying the pressure of the spring, and the thrust is taken by a suitable thrust ball bearing.

Transmission Includes Universal Joints

Referring to Fig. 6 of the transmission gearset, power is taken by the universal joint U1, the same being pressed up on a taper T1, by a nut N1. The universal joint is of large capacity, and being fastened onto the shaft in this secure manner, it is permitted to serve for a long time in a proper and satisfactory manner. This shaft is supported by two annular type ball bearings B1 and B2; they are spaced at a considerable distance apart and are large for the work. At the point of engagement for high gear the jaws J1 are of substantial design, and instead of the two shafts telescoping at this point, an annular type ball bearing B3 is used. The other end of the shaft is supported by the ball bearing B4, and a thrust ball bearing B5 is also placed just back of the bevel pinion. The lay shaft, which is back of the main shaft shown, also rolls on annular type ball bearings. Power is transmitted to the bevel pinion B6 to the bevel gear G1 and is translated by the bevel differential D1 to the jackshafts J1 and Y2, thence to the sprocket pinions. Annular type ball bearings B7, B8, B9, with a mate to B7 on the opposite end, are placed to handle the jackshaft load and a ball thrust bearing B10 is placed back of the bearing B8 to resist the thrust of the bevel gear G1. At every point in this system, the proportions of the parts are in accord with the latest and most approved practice, and in addition to using annular type ball bearings of authenticated ability, the materials employed in the shafts, gears, and other parts are selected for their kinetic characteristics.

In order to show the location of the lay shaft with respect to the main shaft in the transmission gear system, it is necessary to present the section Fig. 7, which is at right angles to the section

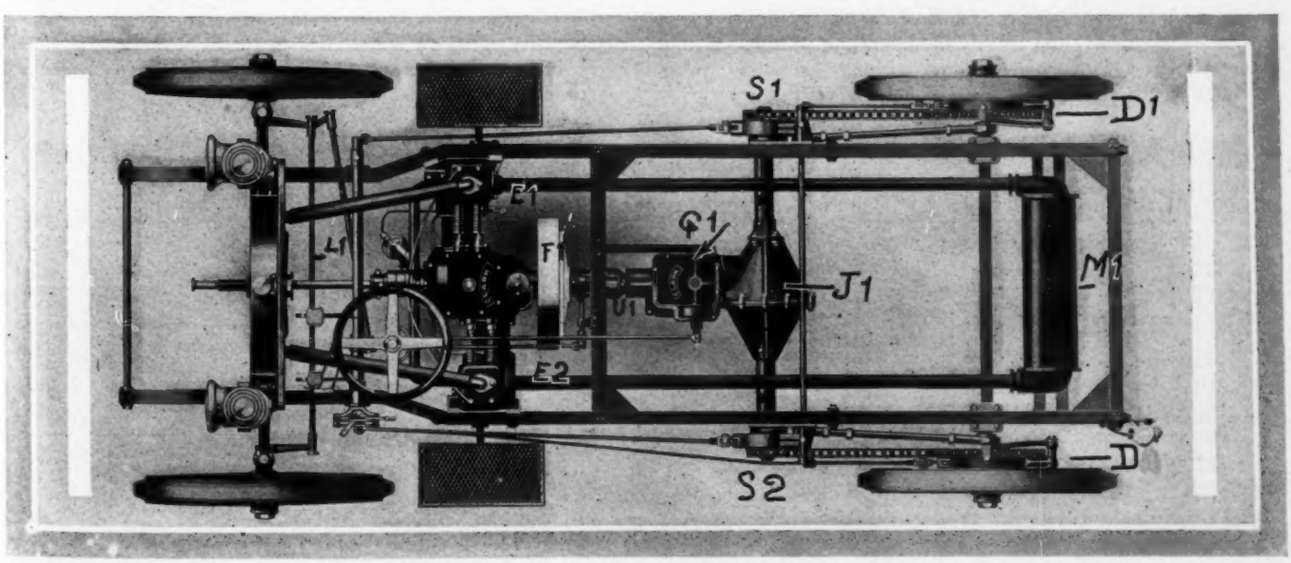


Fig. 2—Plan of the chassis, showing the nesting of the power plant

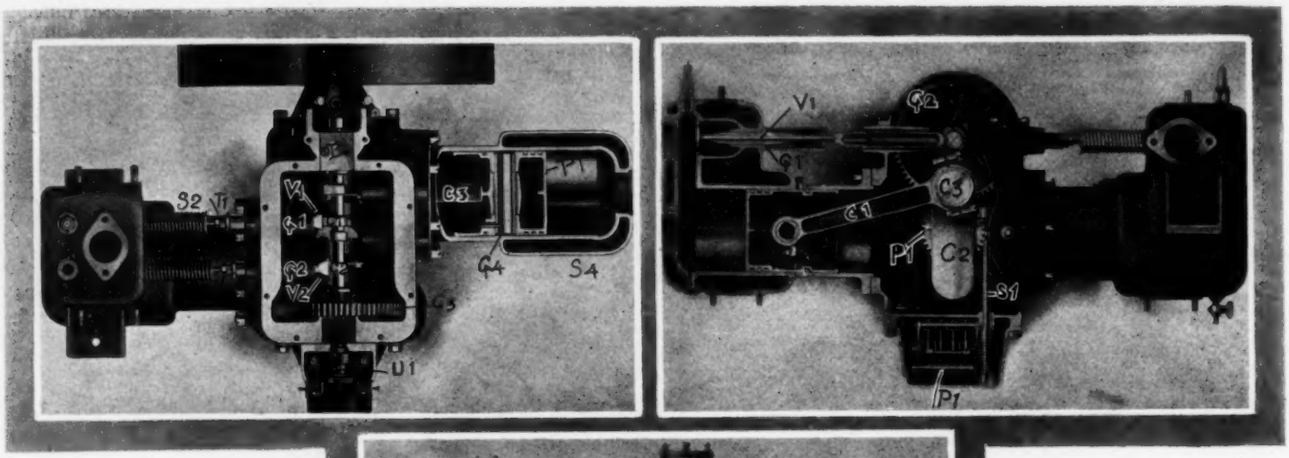


Fig. 3—Plan view of motor and sectional view of cylinders

Fig. 4—Front view of motor; sectional view of cylinders and oiler

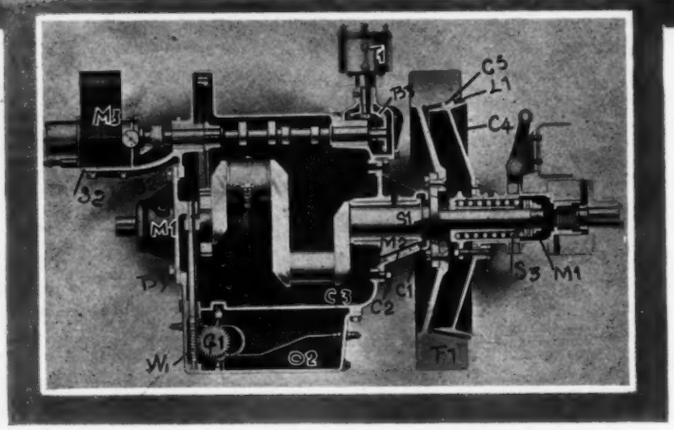


Fig. 5—Sectional view of motor, oiler and clutch

Fig. 6. In this section the lay shaft L1 is in the plane of the main shaft M1 directly below. The relations of the gears are clearly indicated, and the annular type ball bearings before mentioned as belonging to the lay shaft are shown. This section also presents details of design that are not so clearly brought out elsewhere, as, for illustration, the ball bearing housings are presented, and the method of locking the ball bearings on to their spindles is shown with great clearness.

Fig. 8 shows the L-section front axle, details of the steering knuckles, taper roller bearings, methods for lubrication, and an indication of a sufficiently liberal use of metal to sustain in commercial service.

Harmony of Relations Aimed At

The two-cylinder motor is expected to furnish all the power that can be advantageously used in the service of this character, and the opposed type is selected in view of its favorable history in commercial pursuits, but in order to assure a sufficiency of motor performance the cylinder bore is made 5 inches with a stroke of 5 1-2 inches. Next in line on the road to smooth action is the large and suitably fashioned clutch, it being the case that cork inserts have the facility of permitting of slipping, if it is found to be advantageous, without burning the clutch. From the clutch to the sliding gear there is a further bid for harmony through the use of the universal joints as previously shown, and the well-designed transmission gear of the sliding type with two speeds forward and reverse, being progressive in action, eliminates the necessity of using a great measure of intuition in the management. The power being translated from the sliding gear system to the rear wheels by means of an efficient and stable side chain drive leaves little else to be desired, and it is worth pointing out, while the opportunity affords, that this school of design is quite free from harassing detail from the point of view of maintenance. The brakes are of suitable design and efficient for the purpose, and the tire equipment is either solid or pneumatic, depending upon the service to be rendered. The wheel base is 102 inches, and 36 x 2 1-2-inch solid tires are used. The regular price of $1,450 includes the express body as shown in Fig. 1. If the purchaser selects pneumatic tires they will be 36 x 3 1-2-inch and cost $50 extra. If the express body is to be supplanted by a special body, the chassis will be figured in at $1,375. The tool, tire, and regular lamp equipment are included in the chassis price. The company has a well-equipped plant and is making rapid strides in the direction of the production of the cars, of which it proposes to turn out enough to satisfy every investigated demand; but care will be taken not to put cars into service for which they are not intended.

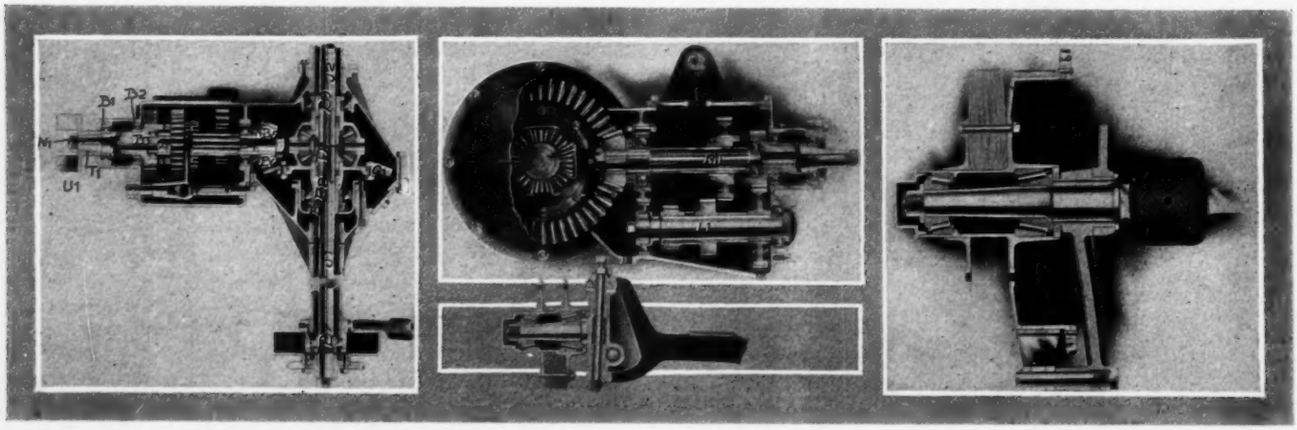


Fig. 6—Sectional plan view of transmission, differential and jackshaft. Fig. 7—Sectional view, side elevation of transmission and differential. Fig. 8—Front axle, presenting sectional view of steering knuckle pin, bearings, and hub. Fig. 9—Sectional view of rear brake drum and wheel bearings

Body Rejuvenation

DESCRIPTIVE OF REJUVENATED E-M-F "THIRTY" BODY AFTER IT IS CHANGED OVER FROM THE REGULAR TOURING TYPE TO CONFORM TO THE CRUISER IDEA, INCLUDING WORKING DRAWINGS.

LAST of a series of working drawings which were offered for the purpose of showing autoists how old touring bodies might be reconstructed at small cost, bringing them up to the latest idea along cruiser lines, using the old body in the new work, without having to alter the same in any way, excepting to provide a new dashboard and utilize a pillar of bent wood in securing the new fore-door in place. Fig. 25 is a side elevation of the E-M-F "Thirty" car as it would appear were it converted in accordance with the working drawings as presented in Figs. 26, 27 and 28. Fig. 26 shows the shape of the new fore-door, and glancing at Fig. 25 it will be observed that it is in the style of the door of the side entrance of the tonneau, with hinges and hasps to match. Referring back to Fig. 26 the dotted lines show the framing, allowing for a door 17 inches wide in the clear, hinged in front, and in harmonious relation with the old body. There is of course no door provided for the right side of the car, and as Fig. 27 shows, the emergency brake lever falls to the outside of the body line, but the sliding-gear lever passes through the body, a slit being provided for the purpose, thus bringing the sliding gear lever to the inside. The overhang of the dash is 4 1-2 inches amidships, is 34 inches across, and 24 inches high at the low point. The flare of the overhang would come in the natural course of construction and would be made to suit the eye. The plan, Fig. 28, will give an excellent idea of the finished result, and as before stated, for other efforts along this line, it is important to refinish the old body in such a way that it would not be possible to distinguish as between the newer and the older portions after the body is painted. This demands a little care on the part of the finisher, who should show some competence.

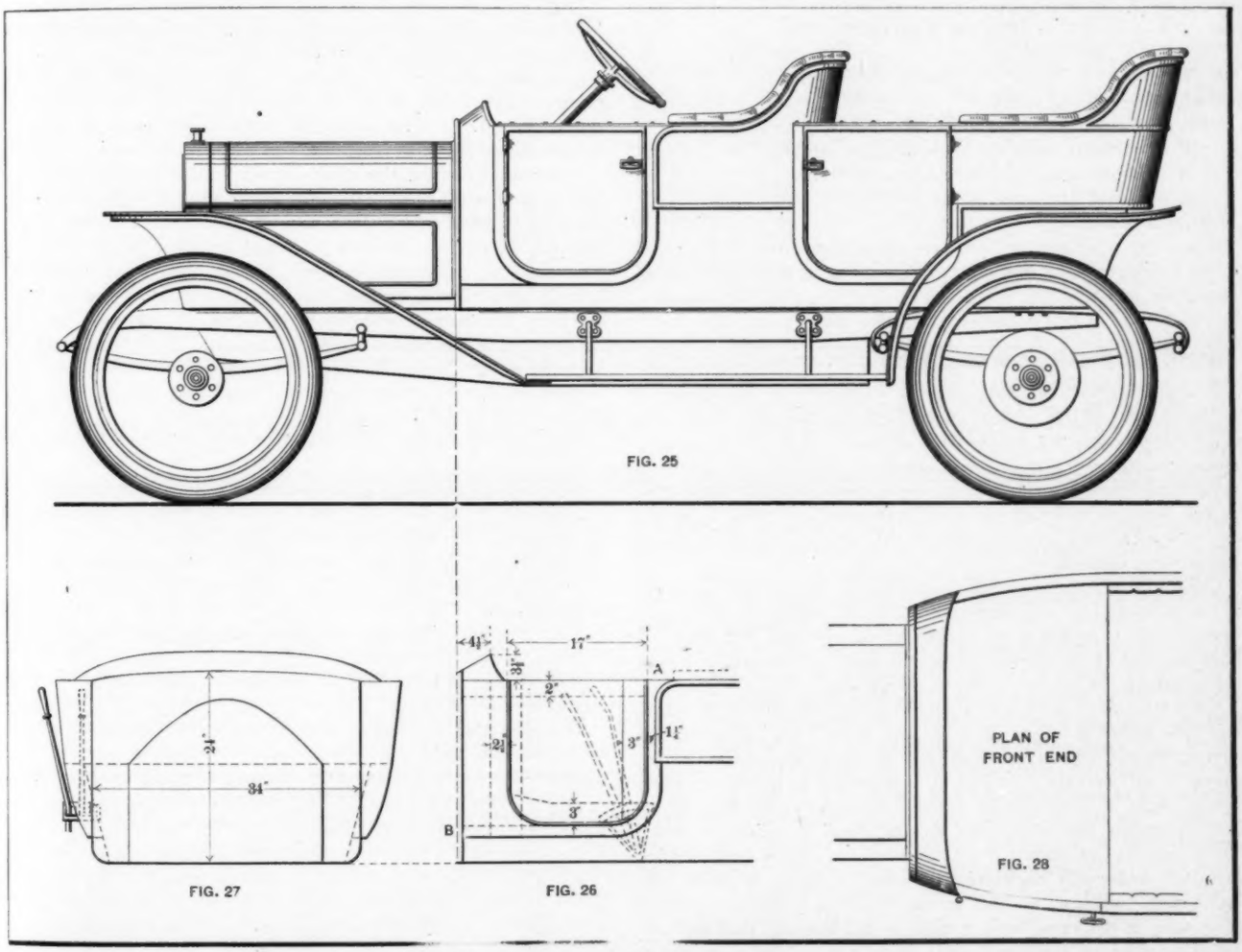


Fig. 25—E-M-F "Thirty" model, with new fore-door type body replacing old touring style. Fig. 26—Detail of new fore-door. Fig. 27—Front elevation. Fig. 28—Plan of front end

Vaporization of Gasoline Discussed

Investigation seems to have shown that the gasoline out of the nozzle is more likely to be in stream formation than as a spray, and the stream is made up of a solid portion surrounded by torn-off globules, some of which are relatively large and the rest grading down to vapor size. Observers have been deceived by the outer wall of vapor which tends to hide the solid central stream and the larger chunks of gasoline which form between the solid stream and the vapor-like outer wall. The claim is almost invariably made that perfect vaporization is brought about by carbureters—such results are not always realized.

Questions

CONSIDERING WIND RESISTANCE; SPEED ON CURVES; EFFECT OF BANKING; CALCIUM CARBIDE; PRESSURE, VOLUME AND TEMPERATURE OF GASES; AUTOMATIC VALVES AND FORMULAE FOR SPRINGS; ADVANTAGE OF STUB TOOTH GEAR.

[193]—Is it necessary to consider wind resistance in connection with the power required to drive the average runabout type of automobile?

No. The wind resistance is scarcely a measurable quantity at 20 miles per hour, is not more than 3 pounds per square foot at 30 miles per hour, nor does it reach 10 pounds per square foot until the speed is equal to 52 1-2 miles per hour in round numbers.

[194]—How is wind resistance determined?

A formula for use in approximating the power required to overcome wind resistance is given as follows:

$$HP = \frac{PA\ (M\ 5{,}280 \mid 60)}{33{,}000} = 0.96\ PAM$$

In which

HP. = horsepower required to overcome wind resistance.
P = pressure of wind in pounds per square foot.
A = front area of body in square feet.
M = speed of car in miles per hour.

Numerical example:

Assuming a car with a front area of 10 square feet and a speed of 60 miles per hour, the power required to overcome this wind resistance will be:

$$H.P. = \frac{13 \times 10\ (60 \times 5{,}280 \mid 60)}{33{,}000} = 20.8$$

It is not believed that this formula will hold out for all ranges in speed, nor can it be said with certainty that the front area total will be correctly stated if the areas of all the parts without respect to shape or location are figured in on the same basis. In all probability, the most certain way to ascertain the amount of power required to overcome wind resistance is to take a certain car and with suitable instrument under road conditions measure the power required.

[195]—In dealing with the questions of car performance on a curve, it would be interesting to know not only the maximum speed at which it is safe to drive, but also the effect of banking, and of declination. Can you state in a comparative way the effect on car under the three conditions?

On a level hard road with a curve of 100 feet radius, the turning over speed is about 38 miles per hour. On an embanked curve, considering the same radius, if the inclination is 10 degrees, it will be safe to travel at a speed of 47 miles per hour, but if there is a declination instead, and the same amounts to only 5 degrees, the safe speed will be about 23 miles per hour. These figures are sufficient to indicate to a driver of prudence that it is extremely dangerous to round a curve if there is a declination, whereas an inclination (banking) renders driving quite safe, at the same time, it must be remembered that increasing the radius of the curve adds materially to the measure of safety.

[196]—During the warm days I noticed that my tires become harder and the tire pressure actually increases, probably on account of temperature. Is there any danger of blowing up the tires?

The real danger lies in not maintaining a sufficiently high tire pressure. None of the hand pumps to be had upon the market as used in automobile work are capable of affording a pressure higher than that which may be safely sustained by tires. A 34 x 4 tire, for illustration, should have a pressure of 80 pounds per square inch as a minimum, and if a tire such as this is inflated to 80 pounds per square inch during the cool of the morning, when the temperature increases, as it will following service and the heat of mid-day, the pressure in the tire will increase considerably, but there is scarcely any danger of obtaining a pressure from these causes greater than the tire is capable of sustaining. If a tire is inflated to 80 pounds per square inch cold, the pressure will increase to about 98 pounds per square inch under the worst conditions likely to be encountered in the summer time. The tire may ride a little hard with this higher pressure, but it will last longer than would be true were the pressure to fall below 80 pounds per square inch. Tires on front wheels may be permitted to run at a somewhat softer pressure, but it is a dangerous experiment.

[197]—At my country house, where I keep five automobiles, I have solved the gasoline problem by purchasing a commodious steel tank, and properly installing the same so that I buy a wagon-load of barrels of gasoline at one time, getting the lowest price per gallon and on the delivery as well, but I have not succeeded in solving the carbide problem. I am purchasing it in cans at too high a cost. Is there not some better way?

After manufacture, the fused carbide is run through crushers just as coal is crushed, and the result is several sizes of carbide which are named in the same way as coal. Lump carbide is the largest size, ranging between 3 1-2 and 2 inches. Egg carbide is the next size, and ranges between 2 and 1 1-2 inches. Nut carbide follows in turn, ranging between 1 1-4 and 1-2-inch, and the size that you would probably want is called "quarter" carbide, ranging in size between 1-2 and 1-4-inch. Those who make a a practice of canning carbide, procure it in tight drums of various sizes, and at a lower price than that ruling for small lots.

[198]—What is calcium carbide composed of and how is it made?

The base of acetylene (calcium carbide) is made in the electric furnace from lime and coke, fused at a temperature ranging between 5,000 and 7,000 degrees Fahrenheit.

[199]—Will you please state the chemical composition of a grade of nickel steel that you would recommend for cementing purposes?

Nickel	Carbon	Silicon	Sulphur	Phosphorus	Manganese
4.5	.10-.15	.15-.20	.03-.04	.03-.04	.30-.40

[200]—What is the variation of volume and temperature with compression?

Assuming that no heat is added or subtracted, the tabulation as follows will hold:

VARIATION OF VOLUME AND TEMPERATURE WITH COMPRESSION

Gauge Pressure	Volume	Temperature
0	1.000	60
2	.910	80.4
5	.810	106
10	.690	145
20	.543	207
30	.454	252
40	.393	302
50	.350	339
75	.276	420
100	.232	485
115	.213	518
130	.197	550
145	.184	580
160	.172	607
175	.163	632
200	.149	672

[201]—In a carbureter, what is the measure of the force of the float in the bowl?

The vertical upward force, in other words the buoyancy, will be equal in weight to the weight of the liquid displaced.

[202]—The opinion obtains in some quarters to the effect that the automatic inlet valve idea in motor designing is less complicated than when a positive method is employed, such as that involving the use of a cam shaft, valve lifts, springs, etc., but practice seems to will to the contrary. What is the matter with the automatic inlet valve?

Force is required to open the valve. This force is only available through suction, and it is at the expense of a more completely filled cylinder. The power of the motor is due to the weight of the mixture taken into the cylinder, and any obstruction in the intake is bound to reduce that power. An automatic valve may be looked upon as one of the most efficacious obstructions that can be devised for the purpose, and while it permits mixture to enter the cylinder after the valve is opened by the difference in pressure between that which resides in the cylinder and that in the atmosphere without, it is, nevertheless, at a great cost in power.

[203]—What are the proportions of the Brown & Sharpe involute form of teeth as used in transmission work?

PROPORTIONS OF INVOLUTE FORMS OF TEETH

$$\text{Whole depth of tooth} = \frac{2.157}{P}$$

$$\text{Depth of tooth above pitch line} = \frac{1}{P}$$

$$\text{Working depth of tooth} = \frac{2}{P}$$

$$\text{Depth of tooth below pitch line} = \frac{1.157}{P}$$

$$\text{Clearance at root of tooth} = \frac{0.157}{P}$$

$$\text{Thickness of tooth at pitch line} = \frac{1.57}{P}$$

$$\text{Width of space} = \frac{1.63}{P}$$

$$\text{Back lash} = \frac{0.6}{P}$$

P = Diametral pitch of gear.

[204]—Is there a formula of any kind that will permit of scientifically designing half-elliptic flat plate springs so that they may be depended upon under the most severe conditions of service?

There are complex methods of arriving at fairly safe conclusions, provided the material used is up to some known and recognized standard. The usual method, however, is faulty in that it fails to take into account the fact that a given amount of material should not be worked beyond a certain limit if it is to last for a long time. One formula recommended for what is known as the safe loading, is: Let,

B = Width of plate in inches.
T = Thickness of plates in 1-16 inches.
N = Number of plates used.
S = Span of spring in inches.
C = A constant = 11.3.

When,

$$\text{Safe Load in tons} = \frac{B\,T^2\,N}{C\,S}$$

To determine the amount of the deflection in inches, per ton of load, the formulæ as follows has been recommended: Let,

D = Deflection in inches per ton of load.
L = Span of spring in inches.
C = Constant — 40,000.
B = Width of plates in inches.

When,

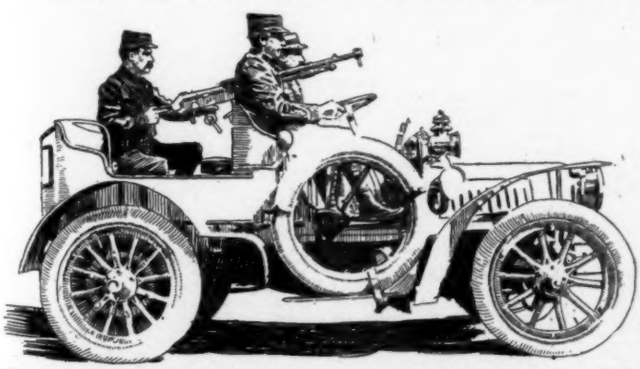
$$D = \frac{L^3}{C\,B\,T^3\,N}$$

Unarmored War Car

DR. ROBERT GRIMSHAW TELLS HOW THE FRENCH GOVERNMENT DURING THE MOROCCAN TROUBLES EXPERIMENTED WITH THIS OUTFIT WITH A VIEW TO ITS USE IN THAT CONFLICT

IN Europe the military automobile has been undergoing many developments and alterations as applied in the service of the various branches of the army—from carrying the general staff conveniently along the best roads, to hill-climbing, for transportation of men and ammunition; from automobiles with heavy armor-plating and mounted with comparatively heavy machine guns, to others which constitute the more humble, "mute and inglorious," but none the less necessary, field kitchen. The latest form is the unarmored machine-gun auto.

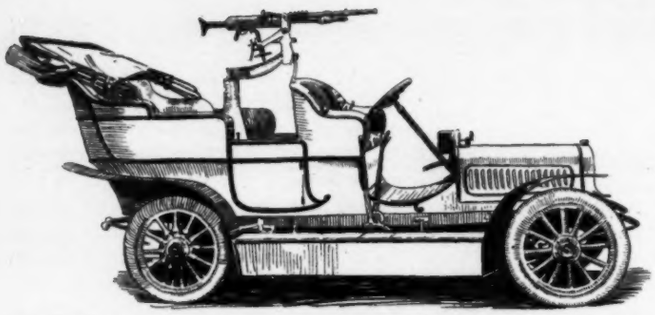
The first advantage derived from the automobile for war purposes was considered to be its emancipation from the track necessary for the locomotive—this giving it necessarily in great part the carrying and towing capacity of the latter, without the limitations of direction which are necessarily inseparable from the "iron horse" of the last century. As a means of offence, however, the railless self-propelled vehicle had its defects—being, of course, somewhat restricted as regards two things: the amount of armored protection which it could carry and the caliber of gun with which it could be equipped; that is, it was either offensively or defensively weak, or both. So the armored auto has not done all that the manufacturers hoped, or the military authorities wished.



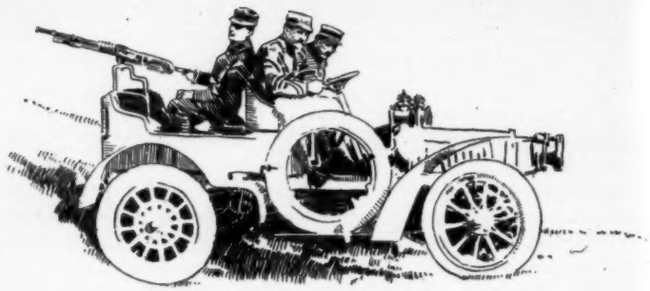
French unarmored automobile war outfit—a Hotchkiss gun mounted on Panhard truck; Capt. Gentil driving

In October, 1905, the German War Department had an armored auto submitted to it by a private firm, on the latter's own initiative. The tests, made before the representatives of the Ministry of War and the troops, did not receive the encouragement that the builders hoped. This vehicle was steel-plated even to the wheels—for, of course, like Achilles, who (if mythology belie him not and do not deceive us) was vulnerable in his running gear—the auto with "pneumatics" would be an easy prey to the enemy if its tires should happen to be burst by sharpshooters or from other causes. The Austrian Ministry of War also made tests in the same field of investigation—in this case with a Wiener-Neustadt Daimler driven on all four wheels. This armor-auto—if I may be allowed the expression, and really I should not—could quite conveniently, thanks to its four-wheel drive, cross plowed land and take hills, on which the ordinary auto, even of lesser weight, would stall. Here, instead of protecting the tires by steel armor-plate reaching nearly to the ground, solid rubber tires were used.

The heaviest caliber of machine gun which it has been considered practical to use is five centimeters, or a trifle short of two inches. The great disadvantage of the armored auto, however, is that it offers to the enemy a much better target than the average horse-drawn field-piece of equal or greater destructiveness. This led to the demand for an armor plating much more resistant, and consequently much heavier, than the shield protecting the horse-drawn machine gun. But this armor materially reduces the offensive power of the wagon. For this reason the idea has gradually been adopted to dispense entirely



Ready to sweep the country ahead with the automobile gun



The gun swung to the rear to keep off pursuers

with the armor and let the occupants simply "take their medicine." Those manning torpedo boats have practically to do this; the officers of the British Army stand when under fire, although their men lie down; why not the auto-gunners? At any rate the result of the idea or the return to the old one, in warfare, is the auto shown herewith, and which is intended to serve in cases where mounted infantry would accompany the cavalry. Should either the running gear or the driving mechanism be put *hors de combat*—which does *not* mean "war horse," as the schoolboy translated it—the only resource would naturally be to spike the gun, or perform the equivalent operation which would render it useless, and abandon the entire rig. The military authorities have not yet decided whether it would not be better to use, instead of the type here shown, motor-bicycles with one man each, suitably armed.

The intermediate step between the entirely unprotected auto here illustrated (the cuts are taken from the *Leipziger Illustrierte Zeitung* for January 16) was the Opel-Darracq machine shown at the last Berlin Automobile Exhibition, and which had only a belt of armor, so that it was entirely unprotected against projectiles falling from above, as where downward fire is directed against it from a hilltop, or shot fired at great elevation makes the corresponding curve in descending, or where a shell bursts in the immediate neighborhood. In order to enable the occupants better to view their surroundings, this vehicle had in the armor belt hinged portions which could be let down to give unobstructed view.

At the recent, most unsuccessful, German Military, Marine and Colonial Exhibition in Berlin there were exhibited alongside of the fully armored auto of the Eckhardt firm, of Zella St. Blasii, the vehicle as shown herewith, and in which, figuratively speaking, not merely the Achillean heel, but the whole Achillean body, is entirely unprotected. The drive is by means of a friction coupling to the change gear, and thence to the rear wheels. There are seats for four persons, and the machine gun is swivelled on a special "lafette"—carriage it could not be named—between the front and the rear wheels in such a manner as to command the entire circle without turning the auto. It is easy to see that such a vehicle would have special value for colonial warfare—meaning, in this sense, war against unmounted savages, insufficiently equipped with weapons and relying on their numbers. This would point especially to its value for certain African conditions; and also, if we leave out the reservation about cavalry, for settling the Moroccan question by force of arms. Whether or not the French Government will do in this respect what it did before with regard to the captive military balloon—namely, postpone its adoption until too late—remains to be seen.

In the meanwhile there went to Oran in December on the steamer *Russie* a Panhard "auto-mitrailleuse," which was at once sent by train to Tlemcen, and for the service of which a detachment of ten men under command of Captain Gentil was detailed. Eastern Morocco would seem to be very well suited for operations with such an auto—perhaps better than the Casablanca district, to which we hear that a similar auto will be sent. These vehicles resemble considerably the light military auto shown at the before-mentioned triple-named exposition by the Rheinische Metallwaren und Maschinen Fabrik.

Fig. 2 shows the French machine gun ready to sweep the field in front; in Fig. 3 the attack is to the rear.

Testing Steel

FOR IMPACT, BENDING, ETC. FINAL INSTALLMENT OF A PAPER PRESENTED BY BERTRAM BLOUNT, W. G. KIRKALDY AND CAPT. H. RIALL SANKEY BEFORE INSTITUTION OF MECHANICAL ENGINEERS (GREAT BRITAIN).

IN the issue of THE AUTOMOBILE of June 23 was printed the first installment of the article of which these tables form a fitting conclusion. The authors presented in a telling way the methods employed and the conclusions reached in the exhaustive tests of various types of steel furnished by British makers. To insure accuracy in the impact tests a falling-weight apparatus was designed. A series of tensile tests were carried out in the usual way on test-pieces made in accordance with the provisions of the British Standard specifications. The methods of analysis employed were those usually accepted by steel chemists. Tensile-impact and repeated-bending tests, as carried out by the experimenters, are fully described in the course of the paper, and the conclusions arrived at are given in the accompanying tables in the form of a comparison of the results obtained. These tables show, among other things, the elastic limit, yield stress, breaking stress, percentage of elongation and character of fracture in the tensile tests, and the energy absorbed in the impact and bending tests.

TABLE 1—CHEMICAL ANALYSIS

1	2	3	4	5	6	7	8
Item No.	Type of Steel	Carbon	Silicon	Sulphur	h phorus	Manganese	Iron by Difference
		per cent	per cent	per cent	per cent	per cent	per cent
1	Marine boiler-plate (shell)	0.255	0.110	0.038	0.028	0.742	98.827
2	Marine boiler-plate (combustion chamber)	0.152	0.019	0.035	0.039	0.601	99.154
3	Locomotive boiler-plate (not exposed to flame)	0.190	0.008	0.044	0.042	0.529	99.187
4	Locomotive boiler-plate (exposed to flame)	0.148	0.024	0.039	0.022	0.562	99.205
5	Forging (Class B)	0.286	0.123	0.019	0.035	0.662	98.875
6	Forging (Class C)	0.411	0.127	0.014	0.032	0.727	98.689
7	Locomotive axle	0.364	0.121	0.023	0.020	0.774	98.698
8	Wagon axle	0.428	0.112	0.031	0.018	0.558	98.853
9	Bull-head rail (Basic Bessemer)	0.449	0.044	0.032	0.081	0.814	98.630
10	Bull-head rail (Acid open hearth)	0.643	0.039	0.030	0.031	0.648	98.609
11	Tram rail	0.520	0.038	0.060	0.046	0.817	98.519
12	Tire (Class C)	0.739	0.347	0.030	0.028	0.720	98.136
13	Nickel-chrome for automobile parts	0.335	0.245	0.031	0.027	Nickel = 2.630 0.666 Chromium = 0.483	95.583

TABLE 2—PRINCIPAL FIGURES OF THE TENSILE, IMPACT AND HAND-BENDING TESTS

1	2	3	Tensile 4	5	6	7	8	9	10	11	12	13	14	Impact (average of 3 test-pieces) 15	16	17	18	19	Hand Bending (average of 4 test-pieces 20	21	22	23	24	25
Item Number	Type of Steel	Carbon Content	Size of Test-piece	Elastic Limit	Yield Stress	Breaking Stress	Elongation Percentage in 2 ins.	3 ins.	5 ins.	8 ins.	10 ins.	Contraction of Area	Fracture	Cross-section of Test-piece	Energy Absorbed	Elongation in 2 Inches	Contraction of Area	Fracture	Cross-section of Test-piece	Number of Bends	Bending Effort Initial	Bending Effort Maximum	Energy Absorbed	Fracture
		per cent	ins.	tons per sq. in.	tons per sq. in.	tons per sq. in.						per cent		ins. diam.	ft.-lb.	per cent	per cent		ins.		lb.-ft.	lb.-ft.	ft.-lb.	
1	Marine boiler-plate (shell)	0.255	0.358	16.0	16.8	32.1	30.5	....	....	....	....	56.4	Silky	0.357	513	34.4	57.0	Silky	0.375	31.1	44.8	51.2	2380	silky trace granular
			1.50 × 1.28	16.6	17.7	31.1	57.0	46.0	37.2	30.9	28.0	54.9	Silky											
2	Marine boiler-plate (combustion chamber)	0.152	0.358	16.4	17.2	26.7	34.2	....	....	....	....	58.4	Silky	0.356	460	39.2	61.1	Silky	0.375	34.2	33.3	44.7	2210	silky and granular
			2.00 × 0.875	17.3	18.7	26.9	54.0	44.0	34.4	27.7	24.9	54.1	Silky											
3	Locomotive boiler-plate (not exposed to flame)	0.190	0.358	15.2	15.6	28.6	32.0	....	....	....	....	54.5	Silky	0.357	440	35.0	56.7	Silky	0.375	29.5	32.0	45.0	1960	silky and granular
			2.00 × 0.300	14.2	14.9	28.0	49.0	40.7	33.4	28.5	26.3	47.5	Silky											
4	Locomotive boiler-plate (exposed to flame)	0.148	0.358	13.9	14.5	25.3	36.7	....	....	....	....	62.4	Silky	0.357	467	39.7	61.7	Silky	0.375	42.9	28.2	40.7	2500	silky and granular showing fibre
			1.50 × 0.57	13.0	13.9	26.0	52.0	45.0	37.8	31.8	29.2	55.8	Silky											
5	Forging (Class B)	0.286	0.357	17.7	18.3	33.2	32.0	....	....	....	....	59.0	Silky	0.358	524	35.1	59.6	Silky	0.375	41.3	39.8	51.0	3020	silky and slightly granular
			0.798	17.9	18.5	32.9	42.0	34.0	26.7	....	....	56.6	Silky											
6	Forging (Class D)	0.411	0.357	21.6	21.9	40.9	23.5	....	....	....	....	49.0	Silky	0.357	424	24.2	50.3	Silky	0.375	24.5	49.1	58.0	2140	silky and fine granular
			0.798	19.6	20.0	39.6	31.5	26.7	21.2	....	....	42.6	Silky											
7	Locomotive axle	0.364	0.358	18.4	18.4	37.6	27.2	....	....	....	....	51.5	Silky	0.357	503	30.2	52.7	Silky	0.375	28.2	43.0	54.8	2380	granular and silky
			0.798	16.1	16.3	36.8	34.5	28.5	....	....	....	43.6	Silky											
8	Wagon axle	0.428	0.358	20.2	20.9	39.3	21.5	....	....	....	....	34.6	85% silky 15% gran.	0.358	408	23.7	38.0	70% silky 30% granular	0.375	12.2	50.0	58.0	1120	granular, two specimens, 30% and 15% crystalline in centre
			0.798	15.9	17.0	37.4	24.0	20.7	....	....	....	27.4	35% silky 65% gran.											
9	Bull-head rail (Basic Bessemer)	0.449	0.358	18.3	18.4	39.1	26.5	....	....	....	....	40.6	Silky	0.357	535	28.9	40.7	Silky	0.375	19.5	48.0	59.0	1660	silky and granular
			0.798	19.3	19.6	42.1	29.0	24.7	19.2	....	....	39.2	75% silky 25% gran.											
10	Bull-head rail (Acid open hearth)	0.643	0.357	25.0	31.2	50.8	16.5	....	....	....	....	26.0	35% silky 65% gran.	0.357	460	19.2	27.3	50% silky 50% granular	0.375	8.9	63.0	72.5	1010	granular and 40% crystalline
			0.798	21.3	22.2	48.5	19.0	16.5	13.4	....	....	22.2	25% silky 75% gran.											
11	Tram rail	0.520	0.357	25.7	26.0	48.9	19.5	....	....	....	....	36.0	70% silky 30% gran.	0.358	492	24.1	38.9	Silky	0.375	14.0	62.5	72.0	1540	fine granular
			0.798	22.2	23.0	47.5	26.2	22.7	18.2	....	....	33.6	40% silky 60% gran.											
12	Tire (Class C)	0.739	0.358	24.6	25.9	56.6	14.7	....	....	....	....	20.8	12% silky 88% gran.	0.357	399	15.9	16.7	granular trace silky	0.375	5.1	74.0	81.7	670	fine crystalline
			0.564	25.0	25.6	53.7	16.5	....	....	....	....	22.0	5% silky 95% gran.											
			0.798	25.9	26.8	54.7	16.2	15.0	12.6	....	....	17.0	2% silky 98% gran.											
13	Nickel-chrome for automobile parts	0.335	0.358	38.6	39.8	50.6	21.5	....	....	....	....	65.3	Silky											
			0.798	41.2	42.0	51.6	31.0	23.7	17.2	....	....	63.8	silky nickel flake	0.357	486	22.9	63.0	Silky	0.375	30.2	72.2	78.9	3240	fine silky with velvety look, bird's-mouth shape

TABLE 3—COMPARISONS OF THE VARIOUS TESTS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		Comparison of Strength. Repeated Bending and Static Tensile				Comparison of Ductility				Comparison of Energy Absorbed per Cubic Inch—Foot-Lbs. per Cubic Foot						
							Ratio of No. of Bends, Col. 21, Table 2, to:			Static Tensile						
Item Nos.	Types of Steel	Breaking Stress Calculated from Impact Test	Ratio of Col. 3 to Tensile Breaking Stress	Initial Bending Effort to Yield Stress, Col. 22 Divided by Col. 6, Table 2	Maximum Bending effort to Breaking Stress, Col. 23 Divided by Col. 7, Table 2	Extension Standard Tensile in Gauge Length $4\sqrt{A}$ Inch Per Cent	Extension Col. 12, Table 2	Contraction of Area, Col. 13, Table 2	Product of Extension by Contraction Area, Col. 7, T. 3 × Col. 13, T. 2	Small Test-Piece	Standard Test-Piece	Impact Tensile	Ratio of Col. 13 to Col. 11	Repeated Bending Test	Static Tensile in Region of Maximum Disturbance	Ratio of Col. 15 to Col. 16
		tons per sq. in.														
1	Marine boiler-plate (shell)	39.9	1.24	2.53	1.65	34.5	0.89	0.57	1.64	1510	1490	2560	1.70	16500	8300	1.99
2	Marine boiler-plate (combustion chamber)	31.4	1.18	1.78	1.66	34.0	1.01	0.63	1.85	1470	1280	2300	1.56	15300	6920	2.22
3	Locomotive boiler-plate (not exposed to flame)	33.7	1.18	2.15	1.61	35.5	0.83	0.62	1.75	1430	1350	2200	1.54	13600	5810	2.34
4	Locomotive boiler-plate (exposed to flame)	31.5	1.25	2.03	1.56	40.5	1.06	0.77	1.90	1460	1420	2335	1.60	17400	7400	2.35
5	Forging (Class B)	40.0	1.21	2.15	1.55	34.5	1.20	0.73	2.11	1660	1480	2620	1.58	21000	9000	2.33
6	Forging (Class C)	46.9	1.15	2.45	1.46	26.5	0.92	0.58	2.17	1500	1350	2120	1.41	14900	6480	2.30
7	Locomotive axle	44.6	1.19	2.56	1.49	30.0	0.94	0.65	2.15	1570	1480	2515	1.60	16500	6230	2.64
														Small tensile test piece	(8340)	(1.98)
8	Wagon axle	46.1	1.18	2.84	1.55	21.6	0.56	0.45	2.06	1310	1130	2040	1.56	7760	3400	2.28
9	Bull-head rail (Basic Bessemer)	49.6	1.27	2.45	1.40	25.0	0.78	0.50	1.99	1580	1320	2675	1.69	11600	6090	1.90
10	Bull-head rail (acid open hearth)	64.2	1.26	2.84	1.50	16.5	0.54	0.40	2.43	1290	1050	2300	1.75	7000	3430	2.04
11	Tram rail	54.6	1.12	2.70	1.52	22.5	0.62	0.42	1.85	1490	1330	2460	1.67	10700	5600	1.91
12	Tire (Class C)	67.2	1.19	2.76	1.49	15.0	0.34	0.30	2.00	1250	1140	1995	1.60	4600	3170	1.45
13	Nickel-chrome for automobile parts	56.9	1.12	1.72	1.53	24.5	1.23	0.47	1.93	1850	1660	2430	1.31	22500	17810	1.26

Letters

QUERIES OF TIMELY INTEREST FROM READERS OF "THE AUTOMOBILE," INCLUDING COMPLEX RELATIONS OF FUEL AND TIMING; SOME FACTS IN RELATION TO A DANGEROUS PROPOSAL; LOOKING FOR TROUBLE IN THE MOST DIRECT WAY; RATHER POINTED QUESTIONS ABOUT IMPORTANT MATTERS; RADIATOR MAY BE OF INSUFFICIENT CAPACITY.

Will Some Expert on Leather Furnish a Recipe?

Editor THE AUTOMOBILE:

[2,342]—Will you kindly tell me in your column "Letters Interesting" what I can do to the leather of a new automobile to prevent the black from ruining one's clothing. Have tried washing with ivory soap and rubbing dry with cloths. There seems to be an unlimited supply of this black stain in the leather. I have had my car eight weeks, and by chauffeur's coat, although washed every week, is still blackened as at first. Is there not some kind of a varnish that could be put on the leather to prevent this? The men in the leather business around here cannot help me.

Bethlehem, Pa. SUBSCRIBER.

Many Fallacies in the Automobile Business

Editor THE AUTOMOBILE:

[2,343]—Is it possible for a 4-cylinder, 4-cycle engine to overheat, with water in the radiator up to the cap? Will ground flax-seed harm the radiator or engine? If so, what is the best way to clean both? Is a low-tension magneto considered as good ignition as a high tension? How can I remedy a magneto (low tension) if it does not spark on slow speed? I notice it will not run the engine as slow as batteries.

Brooklyn, N. Y. J. W. REEVE, JR.

1. An engine will overheat whether the water is up to the filler cap in the radiator or not, provided the conditions in the cylinder are such as to induce overheating, as incrustation within the combustion chamber, or if the exterior surfaces of the dome are crusted up, then, a poorly designed cylinder may heat up independent of the above situations.

2. Ground flax-seed or any other foreign matter in the circulating water should give you all the trouble you can possibly handle gracefully. If you want to keep out of trouble use pure water circulated vigorously, and run the motor so that it will deliver the least possible amount of heat to the cooling system.

3. The best way to keep a radiator system clean is to have one that will not steam, so that the water will not have to be replaced, but if it must be replenished use pure water.

4. Either form of ignition system works perfectly well if it is properly designed, well built, suitably installed and cared for.

5. Time the magneto so that it will deliver a spark more nearly retarded than you now have it. We should think it ought to spark at about 18 degrees advance for the condition you name.

Stenographers Seldom Break Into Racing

Editor THE AUTOMOBILE:

[2,344]—Please inform me through the columns of your estimable paper the best way in your estimation to become connected with the racing team of some automobile factory. I am an experienced stenographer with a good knowledge of automobiles, and am anxious to get in the racing game. Would you think it advisable for me to endeavor to secure a position as stenographer with some factory which enters cars in races and maintains a force of drivers, and from that position try to become connected with the racing end? I noticed in an issue of your paper some time ago the statement that several prominent drivers now before the public were not over 18 years old. Could you kindly give me the names of some of them, and the make of cars they are driving? R. V. L.

Washington, D. C.

The way to become a racing driver is clear to the man who has qualities as follows:

(A) An eye for judging distance.
(B) The digestion of an ostrich (steady nerves and indigestion do not go together).
(C) A bland smile in the face of acute danger.
(D) The machinist trade at the ends of the fingers.
(E) Perfect familiarity with racing automobiles.
(F) A disinclination to do other kinds of work.
(G) Lack of acquaintance with John Barleycorn.
(H) No very great use for tobacco.
(I) Regular hours.

The qualifications which do not seem to be essential to the successful racing driver may be set down after a fashion as follows:

(A) Stenography and shorthand offers no great attraction.
(B) Youthfulness so accentuated as to be classed in the 'teens is all right for a juvenile hopeful, but some racing backers have a penchant for the veteran's experience.

Ideas Drift Along Parallel Lines

Editor THE AUTOMOBILE:

[2,345]—I have been reading your articles on "Automatic Stability in Aeroplanes" with very great interest. It seems to me that an end portion of the wing of an aeroplane could be so hinged that it would remain on the same level as the rest of the wing unless raised or lowered by a greater or lesser wind pressure. This movement would be arranged to tip the ailerons in such a way as to lower or raise the side struck by the wind, just according to whether the wind created a vacuum or the opposite, and thus maintain the stability of the machine.

A WOULD-BE INVENTOR.

New York City.

This is substantially the same arrangement as was proposed by the German engineer, Robert Conrad, in the article rendered in the June 2 issue of this journal, and illustrated in Fig. 1G, except that Mr. Conrad desires to employ the differential movement of two feeler-planes, on opposite sides of the machine, and considers it most practical to make these feeler planes highly sensitive and to have them operate ailerons or other control planes indirectly instead of directly; that is, he suggests to have them indicate to the aviator how *he* should control, because the feeler-planes could not be very sensitive and do work also. But they could operate an indicator by electric contact and thus release other forces, whether the aviator's or those of an auxiliary power device. With regard to the practicability of any arrangement of this order, we would reserve judgment until the apparatus was fully designed, and then once more until it was fully tried.

Wants Particulars of S. A. E.

Editor THE AUTOMOBILE:

[2,346]—I would be very much obliged if you could tell me the character of the Society of Automobile Engineers. I would like to know the qualifications for membership, and whether they maintain a junior membership as all of the great engineering societies do. I am a young man just entering the automobile business and would like very much to take out an associate membership in the society, and at least get their proceedings regularly as they appear.

St. Louis, Mo. B. O.

The Society of Automobile Engineers has a membership of well over three hundred, consisting of the leading engineers, designers and superintendents in the manufacture of automobiles, parts thereof, accessories thereto, and raw materials therefor.

It is the policy of the society to take into its membership all men interested in any field of automobile engineering, and qualified for S. A. E. affiliation.

The qualifications for the various grades of membership are as follows:

A *member* must be 26 years of age, or over, and have been so connected with engineering as to be competent as a designer or as a constructor to take responsible charge of work in his branch of engineering, or he must have served as a teacher of engineering for more than five years.

An *associate* must be 26 years of age or over, and have either the other qualifications of a *member*, or be so connected with engineering as to be competent to take charge of engineering work, or to co-operate with engineers.

A *junior* must be twenty-one years of age or over, and have had such engineering experience as will enable him to fill a responsible subordinate position in engineering work, or he must be a graduate of an engineering school.

Application blanks and literature explaining the present activities of the society may be secured from Coker F. Clarkson, General Manager of the Society of Automobile Engineers, 1451 Broadway, New York City.

Timing of the Franklin Air-Cooled Motor

Editor THE AUTOMOBILE:

[2,347]—In view of the practice of the Franklin Company which takes expression in the form of an auxiliary exhaust valve at the bottom of the stroke, I am bothered with the notion that the timing of the valves will necessarily be different from timing of valves in conventional types of water-cooled, four-cycle motors. Can you state just what the Franklin practice is?

Trenton, N. J. A. R. B.

It is the claim of the Franklin Company that about 70 per cent. of the total weight of exhaust product passes out through the auxiliary valves, so that the main exhaust valve is free to do the balance of the work; but this would not be ground for making any very considerable change in the timing of the exhaust valves and it was reported in the tests made at Sibley College, Cornell University, under the direction of Professor Rola C. Carpenter, that the timing as follows was used by Messrs. Evans and Lay in making these tests:

TIMING OF FRANKLIN AIR-COOLED MOTOR

(A) Inlet valve opened 5 degrees past center.
(B) Exhaust valve closed 12 degrees past center.
(C) Exhaust valve opened on center.
(D) Inlet valve closed 30 degrees past center.

Timing Exhaust Valve with Automatic Intake

Editor THE AUTOMOBILE:

[2,348]—What should the position of the crank be on a four-cylinder engine with automatic intake, when the exhaust valve commences to open and when it is closed? F. W. H.

Sidney, N. Y.

The exhaust valve opening should lead about 40 degrees with the piston on the down-stroke, and it should close with a lag of 10 degrees with the piston making the suction stroke.

Efficiency Depends on Many Considerations

Editor THE AUTOMOBILE:

[2,349]—Will you kindly advise me through the columns of THE AUTOMOBILE whether or not the efficiency of a gasoline engine decreases as the number of cylinders increase. That is, will a six-cylinder engine, of the same rated horsepower as a four-cylinder, consume more gasoline per minute while turning over at the same rate of speed and developing the same horsepower, all conditions being equal? C. M. COLE.

Berkeley, Cal.

Referring to the thermal efficiency, it has been found that the 6-cylinder motor, when well designed, is capable of delivering nearly 20 per cent. of the fuel value in useful work. This high thermal efficiency has never been exceeded by a motor with a lesser number of cylinders, but there are quite a number of tests available which show a close approximation to this with 4 cylinders. This statement is limited, of course, to automobile motors of the 4-cycle type. The gasoline consumption is reflected by the thermal efficiency. It is true that poor carbureters perform badly, particularly if the number of cylinders is increased, and to some extent this situation has given the 6-cylinder motor a reputation for "drinking" gasoline.

Wants to Become Driver of a Racing Car

Editor THE AUTOMOBILE:

[2,350]—Will you kindly answer the following question in your "Letters Interesting." For nearly four years I have tried to become a driver of a racing car, in either a track or road race. I have had five years' experience and have driven a car on a mile track for 1 mile in 4 seconds slower than the records. Can you advise me how to secure a position as a racing driver?

New York City. C. B. M.

Grow a reputation sufficient to attract owners of racing cars. One way is to get permission to become attached to a racing team and "fag" for it without compensation until you attract notice. Another way is to buy a big racing car and enter it on the provincial circuits. This formula is a little bit high-priced.

Radiator May Be of Insufficient Capacity

Editor THE AUTOMOBILE:

[2,351]—I am a subscriber to THE AUTOMOBILE and wish you would answer the following question: I have a 1910 car and every time I use same I have to fill the radiator with water. The motor gets very warm and forces the water up and out of the overflow pipe. It makes no difference how much water I put in the radiator it will invariably empty itself down to below the top of the tubes within three miles running. Is this doing any harm to the motor, or is it natural for some cars to act in this manner? Air must get into the bottom of the radiator and lift the water up to the overflow pipe. Is there any remedy for it? I have heard that it is only a natural condition with the car, but I would like to satisfy myself thoroughly about it.

Harrisburg, Pa. R. H. SENSEMAN.

If the motor is in good working order, that is to say, clean and is operated on an advanced spark, your trouble may be traced to an insufficient cooling system, unless perchance the circulating pump is in a leaky condition. If the motor is quite old, it is possible that incrustation is responsible for the boiling away of the water. It will be understood that the water, after it absorbs heat from the cylinder walls, must have this heat absorbed from it in turn, or the temperature of the water will increase to the boiling point. If incrustation is responsible for the trouble noted, it will be an extremely difficult trouble to overcome. It is quite impossible to be able to get at the incrusted surfaces in the radiator for the purpose of scraping the crust off, and unfortunately it will not come off by a dissolving process through the use of any chemical that will be safe to employ for the purpose. It is just possible that you have the habit of running on a retarded spark. If so, no radiator will suffice for the purpose, and the remedy lies in learning how to operate your motor properly. There is just one other point that may be responsible for your difficulty. Hot water occupies more space than when the water is cold, and you may fill the radiator to the brim, in which case after the water is heated the excess will spill out.

The Pyrometer

ITS DEVELOPMENT AND USE. BEING THE SECOND INSTALLMENT OF AN ARTICLE BY WM. H. BRISTOL READ BEFORE THE SOCIETY OF AUTOMOBILE ENGINEERS AT ITS SUMMER MEETING.

THE platinum-rhodium couple instrument which has been described may be classed as a high-resistance pyrometer in comparison with the pyrometer using a base metal thermo-electric couple.

Base metal alloys have been found as the result of many experiments which produce high electromotive forces with practically uniform increase of the same in proportion to the increase of the temperature, and which have high fusing points, and produce a uniform electromotive force after continuous use, thus meeting the commercial requirements very satisfactorily.

In practice in the treatment of steels the ranges of temperature required are mostly below eleven hundred degrees Centigrade. For this maximum range special thermo-electric couples have been selected, the thermo-electric force obtained from this couple being several times greater than that of the platinum-rhodium couple, making it possible to use an indicating instrument with jewel bearings in place of the delicate suspension galvanometer.

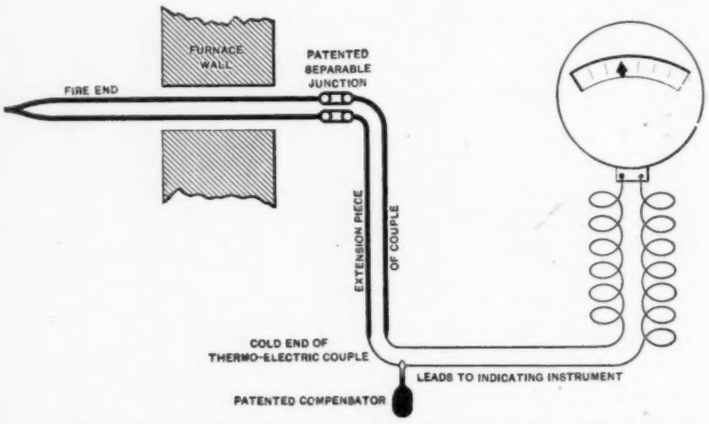


Fig. 2—Fire end of thermocouple applied horizontally through side of furnace

Couples formed of base metal alloys have also been developed for ranges above two thousand degrees Fahrenheit, but they are not capable of withstanding continuously these temperatures.

For convenience in comparing the extra power developed by the base metal couple with that of the platinum-rhodium couple, the table No. 2 gives the electromotive forces for the different temperatures up to 1100 deg. Cent., the figures in this table being obtained from a standard Bristol's pyrometer couple taking an average test. The upper line in the diagram No. 1 shows the curve obtained from plotting the temperatures and millivolts. It will be seen that the line is nearly straight. If the indicating arm of the pyrometer is set at 75 deg. Fahr., the average room temperature, no corrections will need to be made for the cold end, provided it is placed where the temperature is maintained at the average room temperature.

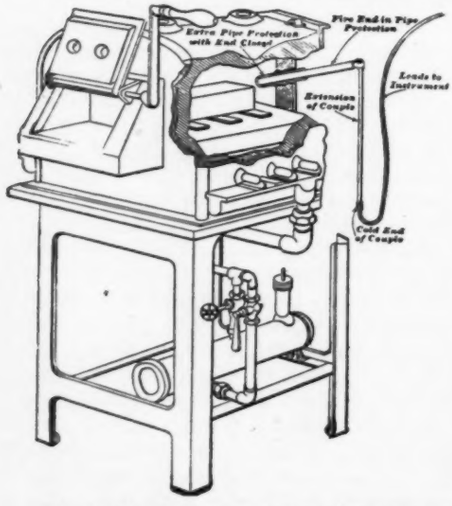


Fig. 3—Showing manner of applying fire end, with extension piece, to furnace

Room Temperature.—As no rare metals are used in the low resistance type of couples it is possible to employ elements of large cross-section which will not be affected in their resistance to any appreciable amount by the variation in temperature along the lengths of the elements forming the couple. It is, therefore, also practicable, in commercial service, to have the thermo-electric couple made of sufficient length to carry the cold end beyond the influence of the radiation of heat from the furnace and conduction along the thermo couple and its protecting tubes.

In practice where the thermo couple is thus extended a novel feature is that of separating the thermocouple into two parts, one which is called the fire end, and the other the extension piece, these parts being joined together as near as practicable to the point where the thermocouple passes through the wall of the furnace in which the temperature is to be measured.

The diagram No. 2 illustrates the fire end applied horizontally through the side of a furnace with the separable junction and the extension piece extending vertically toward the floor with the leads connecting to the indicating instrument.

The advantages of the separable junction will be obvious, as it makes it possible to renew the fire end of the couple whenever it is necessary, with the minimum amount of expense, and secondly it permits carrying the cold end to a point toward the floor where the atmospheric temperature will be practically uniform, and away from the influence of the temperature which is being measured.

Fig. No. 3 shows the manner of applying the fire end with the extension piece to an "American" gas furnace.

Diagram No. 4 shows a bent fire end applied to a metal bath with the separable junction and extension piece located vertically with the cold end near the floor away from the influence of the furnace.

Fig. No. 5 shows a method of applying the fire ends of thermocouples to Brown & Sharpe hardening and annealing furnaces and illustrates the separable junction and extension piece made extra long reaching over the side of the furnace and extending to the floor level away from the influence of the heat of the furnace. In the diagrams above referred to showing the application of the fire end it will be observed that a double pipe protection is represented.

The low resistance type of pyrometers are manufactured in

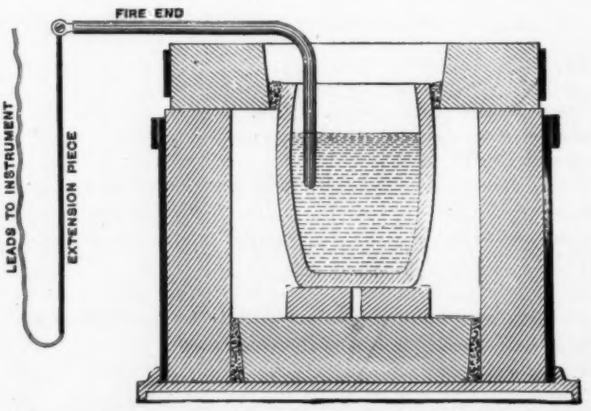


Fig. 4—Bent fire end applied to metal bath, with cold end removed from influence of furnace

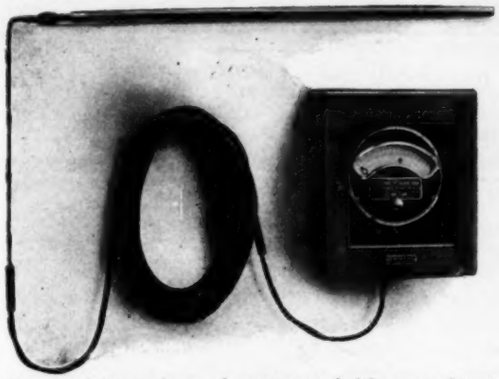


Fig. 6—Low resistance type of pyrometer with separable junction and extension piece vertical

both the indicating and the recording forms, the movements in both instances being of the pivoted type with jewel bearings, as manufactured by the Weston Electrical Instrument Company.

The leads can be made of almost any desired length so that the indicating instrument can be placed at the most convenient point for the observation of the operating attendant.

The low resistance type of instrument is illustrated in Fig. 6, which shows the fire end in a horizontal position with the separable junction and the extension piece vertical.

The details of the construction of the separable joint are shown

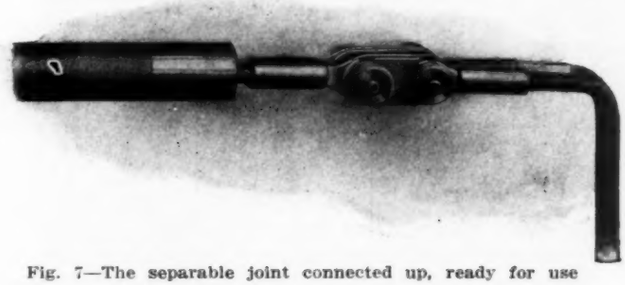


Fig. 7—The separable joint connected up, ready for use

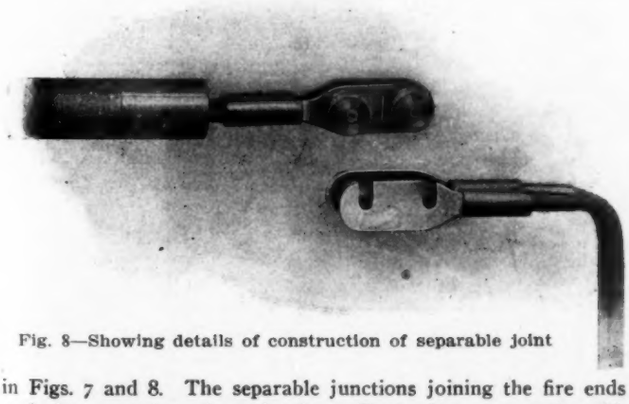


Fig. 8—Showing details of construction of separable joint

in Figs. 7 and 8. The separable junctions joining the fire ends and the extension pieces in these illustrations are made with large bearing surfaces with double screw connections to prevent any possibility of variation of resistance at the junction, and, as will be seen by the illustrations, they are so constructed that it is impossible to incorrectly make the connection between the fire end and the extension piece.

The elements forming the couple and the extension piece are independently insulated in an effective manner by winding each with asbestos cord and coating the surfaces with carborundum paint, using a solution of silicate of soda as a binder. This manner of insulation has proven very effective, especially where the fire ends are placed in iron protecting pipes with closed ends and are not moved about when they are in a heated condition.

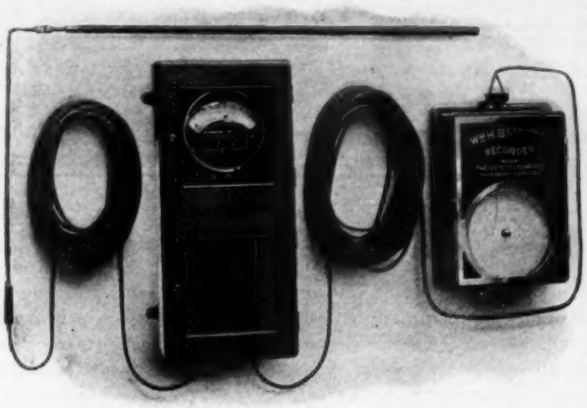


Fig. 9—Complete thermocouple outfit, with indicating instrument connected to single fire end and extension piece

Where the fire ends are applied to furnaces for continuous service a double pipe protection is generally used which can be readily renewed, thus increasing the life of the fire end.

These base metal thermocouples are comparatively inexpensive, making it practicable for a user to keep extra fire ends in reserve for checking and renewing fire ends which have been in long service.

A complete outfit showing the combination of an indicating and a recording instrument connecting to a single fire end and extension piece is illustrated in Fig. 9. This illustration shows the combination unit outfit with the fire end, extension piece and leads to indicating instrument which can be located for the observation of the operator, and also shows the leads connecting to the recording instrument, which can be placed in the superintendent's office, making it possible for the manager of a plant to have before him a continuous record of the temperatures that are being carried at any point in the works. This is a matter of far greater importance than is ordinarily supposed, and the engineer of experience will fully appreciate the innovation and the saving it makes.

(To be continued)

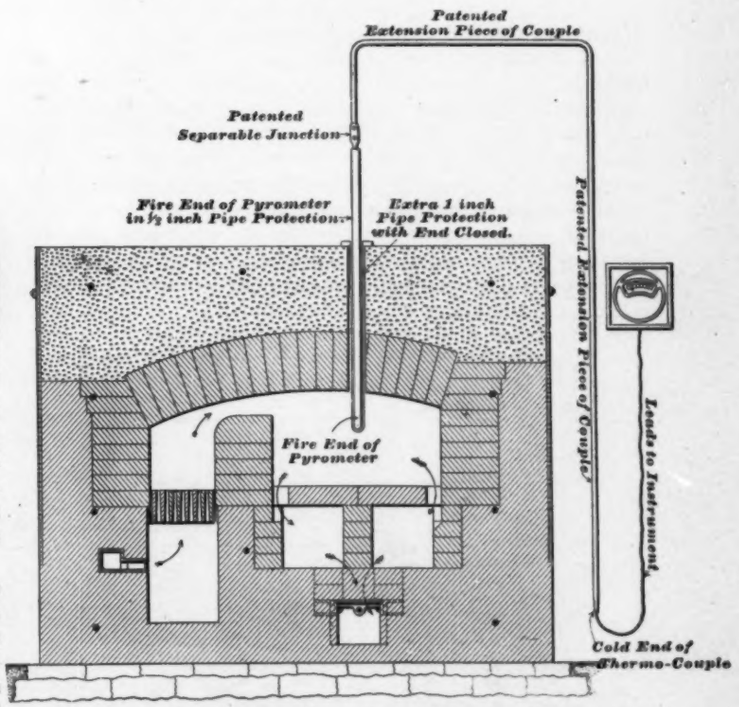


Fig. 5—Method of applying fire end of thermocouple to hardening and annealing furnace

Motor Valves

ABSTRACTS FROM A SECOND INSTALLMENT OF PAPER BY EUGENE P. BATZELL READ AT SUMMER MEETING OF SOCIETY OF AUTOMOBILE ENGINEERS DEALING WITH SLIDE, ROTARY, AND PISTON VS. POPPET VALVES

BY assuming that the gas velocity remains 50 feet per second during the whole period, the inlet valve remains open after the crank has passed the lower dead center, and by further assuming a mean figure of valve opening area for this time, we can determine the maximum quantity of fresh charge which can be forced into the cylinder by gas inertia if no losses take place.

Mean valve port area for cams 1 and 2 = 0.45 square inch.

Mean valve port area for cam 3 = 0.62 square inch.

Duration of 45 degrees crank movement at 1000 revolutions per minute = 0.0075 second.

(1) Quantity of gases $50 \times 12 \times 0.45 \times 0.0075 = 2$ cubic inches.

(2) Quantity of gases $50 \times 12 \times 0.62 \times 0.0075 = 2.8$ cubic inches.

"The piston displacement being 117.8 cubic inches, these quantities constitute 1.7 per cent. and 2.38 per cent. of the piston displacement volume. These figures are the maximum possible, and they show that a late closing of the inlet valve cannot have any direct influence on the motor power. Only if the motor were choked strongly at high speed with partly closed throttle or by smaller valves so that there would be considerable vacuum in the cylinder, would the supplementary cylinder filling through late inlet closing be of direct value. The main reason for a late inlet closing is that the cam becomes of fuller shape, affecting the valve port area in such a way that the intake gas velocity is kept lower during the piston suction stroke and the quantity of fresh charge then drawn in is increased. This influence of late inlet closing on the motor power is thus indirect.

"To obtain an air velocity of 170 feet per second, without considering losses, a difference in pressure of approximately 0.25 pound per square inch is required. The difference in pressure required for an air flow (if this difference is not very great) may be found from the equation:

$$P = \frac{V^2 \times Q}{2g \times 144} \text{ pounds per square inch.}$$

where V = air velocity in feet per second, Q = weight of 1 cubic foot of air (about 0.081 pound), and g = gravity acceleration = 32.16 feet. A flow of 50 feet per second requires only about one-twelfth the pressure difference from a flow of 170 feet per second. From this it is seen that without extra resistance the vacuum inside the cylinder necessary or the gas flow is very small, but owing to the existing resistance it may amount to some pounds per square inch in motors only slightly throttled. Therefore, the curve of actual gas velocities through the valve ports differs greatly from the theoretical one, especially at the beginning of the valve opening. This actual velocity will follow approximately curve v, Fig. 2, the shape of which is merely a rational guess. At the 170 degrees crank position this curve v shows no marked difference from curves v_1, v_2 and v_3, and there may be seen also the little direct influence of late inlet closing.

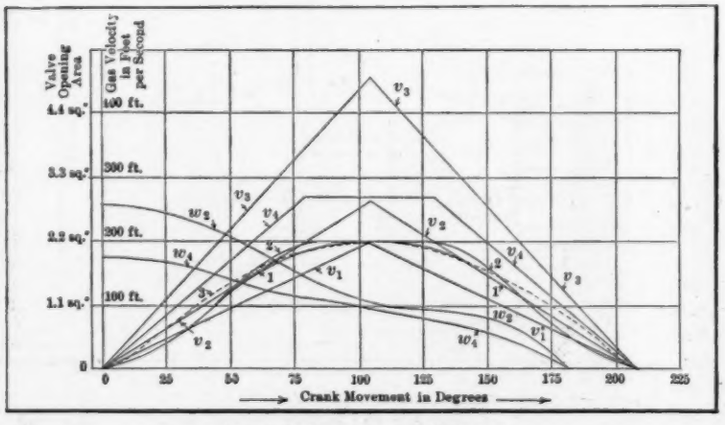


Fig. 4—Valve-opening diagrams

"From the gas velocity curves it may also be deduced that it is more important, from the standpoint of motor power, to have a quick opening inlet of small size than a slower opening inlet of large size. And it is also better to obtain a certain valve port area through large valve diameter and small lift, than small diameter and high lift. The cams for high and small lift being made of the same type, say for instance both after Fig. 1, No. 1, will have coinciding valve opening curves on the length of their straight flanks. The valve with smaller lift, but with a larger diameter, will also have a larger port area during this time and this will help to reduce the high intake gas velocity at the inlet beginning. The influence of a change in the time of valve opening is noticeable by comparing curves v_3 and v_4 of Fig. 2. Curve v_4 corresponds to cam 3 with the valve opening starting at "0" degree crank position. It represents a much lower and also much more constant gas velocity at the beginning than curve v_3; and, besides, these curves practically coincide further along. It follows that, theoretically, an early inlet opening is advantageous, and this statement is true for high speed. In practice, however, better results are sometimes obtained with somewhat later inlet openings, but if a certain long duration of inlet opening is desired, it is better to start and close early, because a too late inlet closing will result in motor power loss. The inlet valves should close before the moment when the piston in its backward stroke compresses the charge inside the cylinder to the pressure in the intake pipe. With a fairly opened throttle, and at normal speed, the cylinder at the end of the suction stroke will hardly contain more than 80-85 per cent. of a full charge. Also the amount of supplementary cylinder filling is very small under the conditions cited, and, therefore, there is no likelihood of a return flow until after about 10 per cent. of the return stroke, or nearly 45 degrees of crank movement. A lag of 30-40 degrees in the closing of the inlet valve is, therefore, not harmful in this respect. However, when the throttle is nearly closed, the pressure inside of the intake pipe will not differ much from that inside the cylinder, and then the piston in making 10 per cent. of its return stroke while the inlet valve is open will cause a part of the cylinder charge to be expelled into the inlet pipe. This results in loss of power and efficiency.

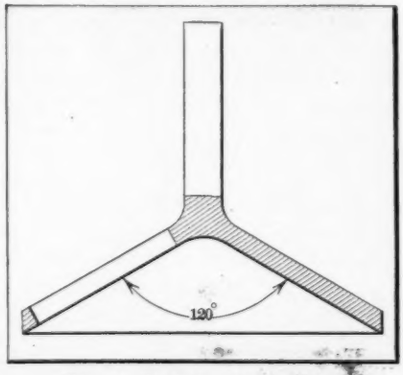


Fig. 3—Conical rotary valve

"If the compression space is 25 per cent. of the total cylinder volume, and the compression starts at 10 per cent. of the return stroke, the effect will be the same as if the compression space were 27 per cent.; but with a compression beginning at 2-3 per cent. of the return stroke,

corresponding to a lag in inlet closing of 20-25 degrees, the rated compression of 25 per cent. may be figured on. Other conditions being equal, these compression ratios will result in the following compression and explosion pressures, and theoretical efficiencies:

		Explosion Pressure	Thermal Efficiency Per Cent.
Compression pressure $P_{25} = \frac{v^1}{v}^{1.35} \times 13 = 84.5$ pounds square in absolute		300	39
Compression pressure $P_{27} =$ pounds square inch absolute	76.	270	37.5
Difference	= 8.5	30	1.5

"Having thus discussed the phenomena of the inlet with poppet valves, we could now take up the exhaust in the same way. However, the determination of exhaust gas velocity is a very complicated problem. As long as the pressure inside the cylinder is higher than the pressure in the exhaust pipe we have a flow of gases through an orifice under a pressure difference. This flow depends on the physical properties of the gases, their temperatures, etc. Moreover, the flow occurs under variable pressure differences. It would, of course, be possible to construct a theoretical curve of gas velocity, but it is such a complicated matter that the results would hardly justify the attempt. Being already familiar with inlet valve opening diagrams, and assuming that exhaust valve diagrams closely resemble them, some interesting conclusions can be drawn. The exhaust velocity curve and also the curve of the pressure inside the exhaust pipe is most likely undulatory, with waves of great amplitude at the beginning, quickly decreasing. A sudden escape of gases is followed by a heavy drop in pressure inside the cylinder, which may become lower than atmospheric. This vacuum is then filled in by the outside pressure, with a certain excess pressure due to gas inertia; again the gases expand, and so forth.

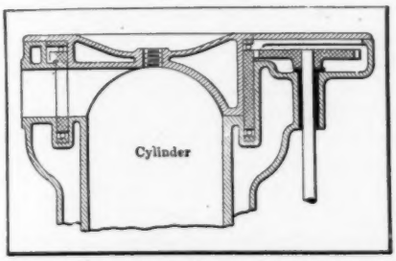


Fig. 5—Revolving sleeve valves outside cylinder

"In the case of gradually opening valves the exhaust has to begin at some point before the piston reaches its lower dead center, otherwise there would be considerable back pressure on the piston during the early part of the exhaust stroke, and consequently loss of power, the latter greater than that due to a reasonably early exhaust opening. If the exhaust begins to open early it may be more lingering. The pressure inside the cylinder at the lower dead center should be practically equal to that in the exhaust pipe.

"The exhaust gas velocity can be depicted approximately by noting the character of the inlet valve opening and supposing it to be shifted over to the right 20 or 30 degrees. An exhaust cam for 40 degrees lead and 5 degrees lag gives the maximum opening at 72 1-2 degrees after the lower dead center, or about 25 degrees before the maximum piston speed is attained. The gas velocity curve will, therefore, slowly rise from 0 degree to 72 1-2 degrees; then rise at a quicker rate to a point of maximum piston speed and gradually drop from this point to zero at the upper dead center. The smaller the gas velocity during this period the less resistance there will be on the piston. An exhaust valve giving a large, quick opening will be favorable not only in this respect but will allow also of a later exhaust beginning. The motor power can be increased by using large exhaust valves as well as large inlet valves.

"It is advisable in many cases to close the exhaust valve after the piston reaches its upper dead center, and particularly so if the exhaust valve closes gradually. At high speed there is considerable back pressure at the end of the piston stroke, and if the exhaust were closed exactly at 0 degree, the pressure line would follow an expanding curve during the piston travel and the admission of fresh charge would begin only at the end of the travel." The author went on to say: "From what has been said it can be seen that quick closing of the exhaust is preferable, with respect to the back pressure."

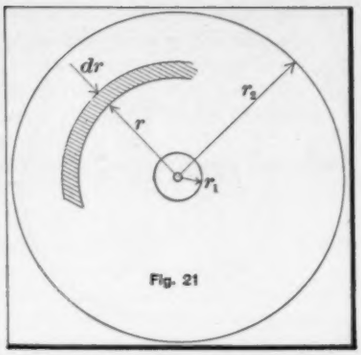


Fig. 6—Diagram indicating power required for rotary valves

As an illustration of a type of rotary valve that might be a possibility in automobile work, the old "Raymond" valve motion was referred to, and some of its qualifications from a theoretical point of view were discussed. The author failed, however, to take cognizance of the fact that the better part of a million dollars was dissipated upwards of twenty years ago to make this type of valve popular, but the project failed. As a matter of record, a 4-cylinder, 4-cycle automobile type of motor, with a bore of 12 inches and square delivered barely 50 horsepower. There were some hundreds of these motors built and the testing facilities available at the time were adequate, so that failure was largely due to the poor results obtained by this plan. It will be remembered that the smaller sizes of motors performed fairly well, but there were times when the flat rotary valve rubbing against the flat dome of the cylinder gave lubricating trouble which could only be cured in a percentage of the cases. This type of valve was modified and reproduced in THE AUTOMOBILE possibly a year and a half ago, and as was suggested at the time, the conical shape afforded larger port areas, and should perform somewhat better, as Mr. Batzell states: "A conical angle of 120 degrees (combined) affords a port area of 15 per cent. over that of the flat valve in the case taken." The conical valve of the rotary type referred to is shown in Fig. 3.

In relation to constant gas flow through rotary valves, the author plotted curves as shown in Fig. 4, stating: "The maximum valve opening is not important by itself, as the time factor also enters into the problem. In rotary valves driven at a constant speed, and with ports shaped to give the maximum possible opening area, the area of opening at any moment is proportional to the angle through which the valve has turned. The area of opening increases uniformly from the beginning of the opening until the maximum is obtained and then decreases in the same manner. The curve representing the change of this area with reference to the crank movement will be an equilateral triangle. The curve for the Raymond type of valve is given as v_1 in Fig. 4, and for the sake of comparison the curves of the

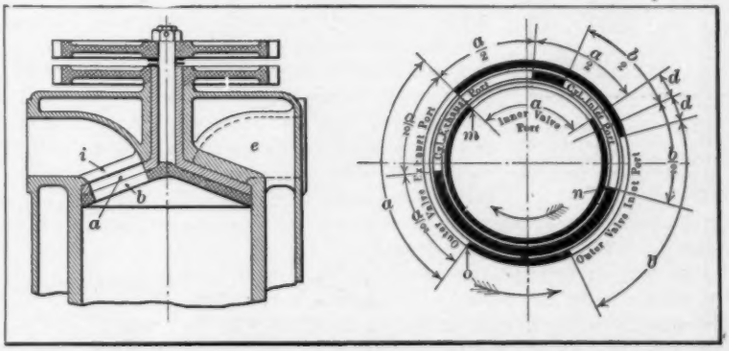


Fig. 7—Double rotary valve. Fig 8—Position at time of exhaust closing of Fig. 7 valve. Motion transferred to cylindrical for clearer understanding

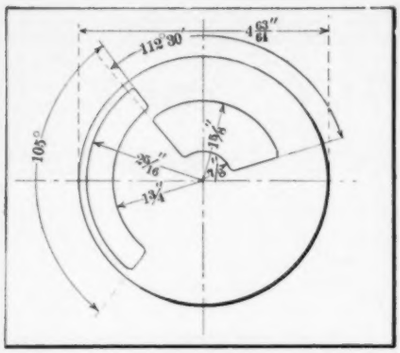


Fig. 9—Another double rotary valve construction

cams as depicted in Fig. 1 (first installment) are reproduced in Fig. 4, but all openings start at 0 degrees of crank position. (In this article the cylinders are supposed to be in the same plane as the crankshaft—not offset). It will be seen that the curve v_1 has a much smaller enclosed area than curves 1, 2, and 3. Moreover, the valve opens and closes but a trifle quicker than with cams 1, and 2; Fig. 1, and less quickly than with cam 3. The theoretical curve of gas velocity will not be as good with this type of rotary valve as with poppet valves, but the actual condition of the gas flow may be better. In poppet valves, the gas flow into the cylinder through a comparatively narrow opening offers considerable resistance. Besides, a part of this annular opening is close to the walls of the explosion chamber unless the valve is located in the center of the cylinder head, and that tends to change the flow through the valve. The paths of unequal length which the gas particles passing through the different section of the valve opening must travel further diminish the value of the poppet valve port effective area. The rotary valve, on the contrary, will allow a practically constant flow through its total area, and with small loss.

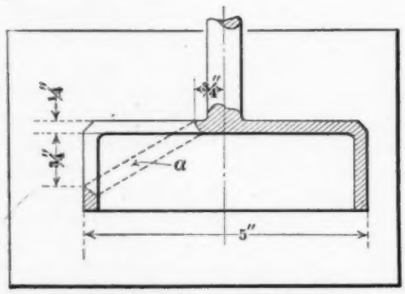


Fig. 10—Cap form of rotary valve

"The flat disc valve can be improved in respect to cylinder filling, if it can be made larger." The author points out that by having separable cylinder heads, the flat valve can be made of larger diameter than the bore of the cylinder.

Referring to the question of the power required to drive rotary valves, the author states: "The rotary sleeve, if properly made and lubricated, may consume very little power, particularly systems like Fig. 5 in which the valves are not exposed to the explosion force or to the side pressure of the piston on the other side. Systems with disc or cap valves are subjected to friction, caused by the full force of the explosion which might aid one to believe that a great amount of power is required for their driving.

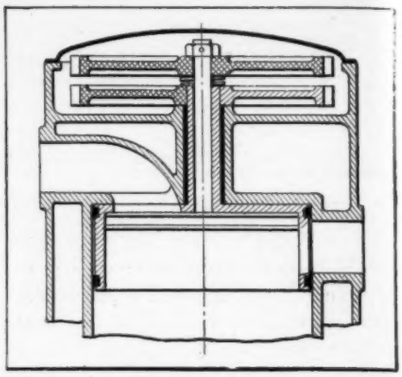


Fig. 11—Modification of cap valve shown in Fig. 10

Assuming pressure of valve against seat has a mean value of t, Fig. 6, the power necessary to overcome the frictional resistance of an elementary band of radius r and of width dr is:

$$p \times f \times 2\pi \times r \times dr \times \frac{R.\ P.\ M.}{2} \times 2\pi \times r,$$

Where f is the coefficient of friction R. P. M. are expressions in motor revolutions for a halftime valve." The author continues with the arithmetical expressions integrating between limits, r_1 and r_2, simplifying and substituting, finally arriving at the conclusion that the motor taken when developing 10 horsepower on the brake at 1,000 revolutions per minute with a mechanical efficiency of 83 per cent. with a valve friction of 0.1 consumes 0.525 horsepower in operating the valve.

Fig. 7 shows a double rotary valve. Fig. 8 is a diagram of the same, and Fig. 9 is another double rotary valve construction. In considering the power required to drive these types of valves, Fig. 7 works out on a 1.15 horsepower basis.

Fig. 10 shows a cap form of rotary valve, and Fig. 11 is a modification of this cap form of valve.

(To be continued.)

Digest

BRIEF RÉSUMÉ FROM 50 FOREIGN PAPERS; HANDLING 2-CYCLE LION-PEUGEOT MOTOR; LOUIS RENAULT MOTOR; PRODUCTION OF VALVELESS 4-CYCLE MOTORS; HIGH-VOLTAGE STORAGE BATTERIES, AND ADVANCES IN AVIATION

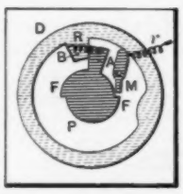


Fig. 3—Diagram of device for starting ignition with magneto in Lion-Peugeot two-cylinder V-motor

A partial description is offered of the two-cylinder Lion-Peugeot automobile motor, which is a close kin to the motorcycle of the same make, though with enlarged dimensions, and of the single cylinder, long stroke motor which was favorably noted at the recent racing meet and hill climb at Boulogne. The two cylinders are placed at a V of only 20°, and are cast in one block integral with their water jackets and with a valve-enclosing chamber. The latter is accessible through a gate at the top which may be removed by loosening a single screw. Particularly in the motocycle type of motor this arrangement serves to obviate spattering of oil from the valves and to reduce noise. A bevel gear *J* on the motor shaft *Y* drives the shaft *N* which in turn drives the camshaft *F* by spur wheels, and the cams *SS* for the exhaust and *TT* for the admission actuate the bell cranks *A* on the shaft *U*, the latter being adjustable longitudinally, as indicated in one of the accompanying illustrations, so as to reduce the compression for starting in the well-known manner by keeping the intake valve open longer than normally. The magneto and the pump are mounted on a shaft parallel with the camshaft and are rotated from the latter by means of straight spurwheels of equal size, so as to turn at the same speed. One of the connecting rods embraces the whole width of the crankpin *H* between the two internal flywheels WW, and the other connecting-rod knuckle is a simple steel ring bearing on the outside of the first one as at *hhh* in the second illustration, the relative motion of one rod to the other being so slight that only small bearing surface is required. *G* represents the inlet for lubricating oil. *L* is an end thrust ball bearing. A locking arrangement for securing and adjusting the valve springs is indicated at *d*. In order to produce ignition by the magneto *M*, without resorting to variable advance of the spark, there is mounted upon the shaft of the magneto a disk *P* which carries a lug *A* which is normally pressed strongly against another lug *B* forming part of the actuating pinion *D* (driven from the camshaft). But the disk *P* may be stopped in its rotation by a pawl *M*, controlled by the driver. In that case the pinion *D* continues to turn and lugs *A* and *B* separate, but the spring *R* tends to draw them violently together. At the moment chosen for ig-

nition a cam fixed upon pinion *D* releases the pawl *M* and the disk *P* is then very much accelerated, until the two lugs are again in contact, but meanwhile the rupture has been produced in the magneto with great force, because the moment when the pawl released the tooth *F*, the lug *B* had already passed the position corresponding to that set for normal ignition. This device is only used for starting and when it is desired to get the advantage of fully advanced ignition. For normal travel, the magneto is permitted to cause ignition for one of the cylinders 10° ahead of the position which would be chosen for a motor with vertical cylinders, and for the other cylinder 10° behind time. But the explosions in this motor must of course take place at intervals of alternately 380° and 340°. It is made with either 75 mm. bore and 150 mm. stroke or with 85 mm. bore and 150 mm. stroke, giving respectively 12 and 16 hp. according to the rating, but in reality much more.—*La Vie Automobile*, July 2.

Drawings reproduced from a patent recently secured by Louis Renault show a cylinder *a* flared conically at the top and a valve sleeve *b* concentric with the cylinder and similarly shaped. The conical part of the sleeve is provided with four ports adapted to cover and uncover successively the induction and exhaust openings *A* and *E* in the cylinder. The sleeve in whose cylindrical portion the piston *c* travels is rotated around its axis by means of a spiral gear *e* near its bottom driven by a worm *d*, and its speed of rotation is one-eighth of that of the crankshaft. The ports 1, 2, 3 and 4 of the sleeve are spaced 90° apart (measuring on the plan projection instead of on the cone), while the induction and exhaust ports in the cylinder are offset suitably to admit of advancing the exhaust and retarding the closure of the induction. Suppose the intake opens 10° past the upper dead center and closes 25° past the lower dead center and that the exhaust opens 40° past the lower dead center and closes 5° past the upper dead center. The manner in which the mechanism will function may now be realized. The intake is open for the space of 195° and the exhaust for 225°. The compression and the explosion or expansion, during which phases of the cycle all openings must be closed, comprise 295°, and between the closing of the exhaust and the opening of the intake everything is closed for 5°. These four divisions of the full cycle of 720° must be represented on the sleeve in the space of 90°, since the sleeve turns once for eight revolutions of the crankshaft and consequently one-fourth of a revolution for the two revolutions representing a full cycle. The angle *A* representing the intake on the sleeve must then be one-eighth of 195° or 24° 22′ 30″. The angle of compression and explosion, $C + D$, must similarly be 295° divided by 8, or 36° 52′ 30″ and the angle of the exhaust *E* must be 28° 7′ 30″, and finally the small angle of closure between exhaust and induction must be 37′ 30″. If the ports are limited by two *radii vectores* of the cone which in plan projection are 12° apart, for example, it will be necessary to give to the opening *A* in the cylinder a width of 24° 22′ 30″ minus 12° = 12° 22′ 30″ and to the opening *E* similarly 16° 7′ 30″, and the size of the openings may be made as great as necessary by enlarging them as well as the sleeve ports radially. The exact positions of the cylinder ports are readily determined. Under the suppositions of timing assumed above, the motor functions for 715° between the moment when induction begins and the exact moment when the exhaust closes. If port 1 has uncovered the admission it is port 2 which must uncover the exhaust in the same cycle, since no other port of the sleeve can pass the exhaust opening meanwhile. The opening edges of cylinder ports *A* and *E* must therefore be a certain distance apart corresponding to the sum of 90°, which is the distance from port 1 to port 2, and 61° 15′, being one-eighth of 490°, which under the suppositions given is the distance between the beginning of the induction and the beginning of the exhaust. This places the two opening edges 151° 15′ apart, and under different assumptions with regard to the proper moments for opening and closing of the ports this would be varied accordingly, of course.

The upper part of the sleeve, it is noticed in the illustration, is provided with three grooves in which are lodged tightening rings *f* to prevent the escape of gas from or to the cylinder. In his patent Renault also secures a sleeve in which there are only two ports, in which case the sleeve will be required to rotate at one-fourth the speed of the motor. The author comments upon the advantages of the construction in securing an unimpeded path for the gases, its robustness and simplicity, and he holds that, if the ports seem small, they may be easily enlarged by lengthening the cone and reducing its angle.—F. Carlés in *La Vie Automobile*, July 23.

Only large manufacturers can see their way to go into the production of valveless four-cycle motors and this fact is becoming an additional reason for large manufacturers to go into it, apart from the merits of the type, everything being welcome which promises distinction from the small producer and doubly welcome if it is plainly in the line of mechanical progress. The difficulties of adequate production, involving high accuracy, superior materials and the possession of an elaborate equipment of intricate machine tools, become a recommendation when the eventual results are assured. Something of this view, tempered with consideration for the large majority of the members of the industry who are not prepared to make all the changes and submit to all the expenses involved in the discarding of the poppet valve, is leaking out in the European press in many devious ways and expressions scattered throughout many paragraphs and articles. The success accomplished with the Knight motor by the British Daimler company and by the Minerva company of Antwerp, Belgium, their invasion of the French market, the readiness of the Panhard-et-Levassor firm to turn out their first chassis with valveless Knight motor, this fall, and trials which show 42 hp. for a valveless motor of dimensions which could not be made to yield more than 35 hp. with the older system and the same fuel consumption, constitute facts which divide the automobile industry of Europe in two camps, one consisting mainly of the large manufacturers, who look forward to the valveless motor in some form, as a savior of distinction and price, and another comprising a much larger number in all classes who work feverishly to perfect the motor with extraordinary length of stroke or the two-cycle motor or one of the types of motor which have sprung into existence through

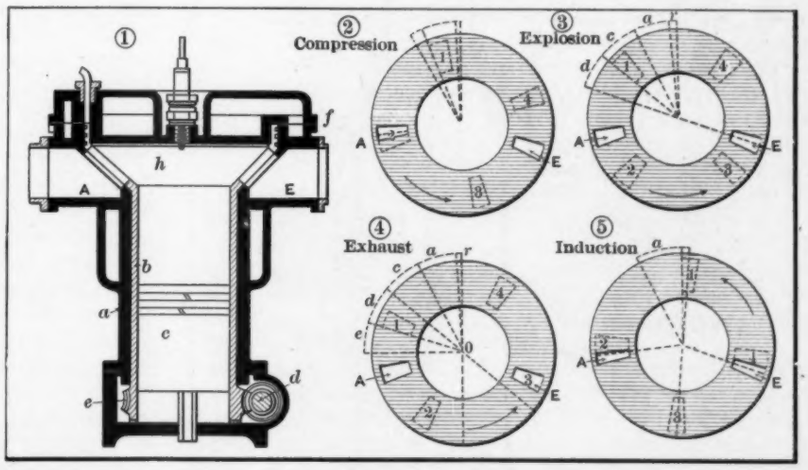


Fig. 4—Reproduction of patent drawing for Renault valveless motor. (1) Sectional view of cylinder. (2) Plan view showing position of ports at end of suction stroke. (3) When port 1 has passed the angle c, representing the compression period, the explosion will take place. (4) Exhaust to begin. (5) Suction to begin.

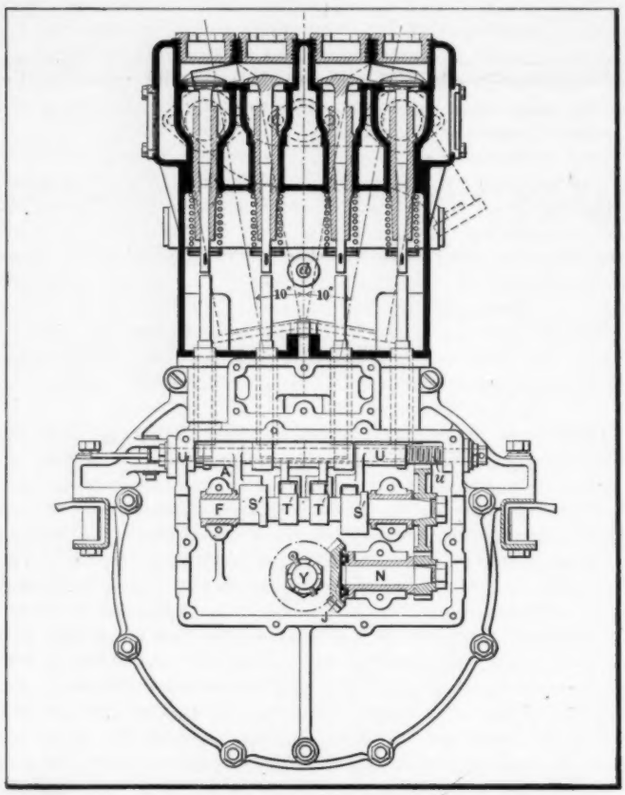


Fig. 1—Section through the valves of the 12-h.p. Lion-Peugeot two-cylinder automobile motor

the demands of aviators and promise suitability for automobiles. Among the large number of articles whose gist is given in the foregoing remarks one deals with the patents secured by Louis

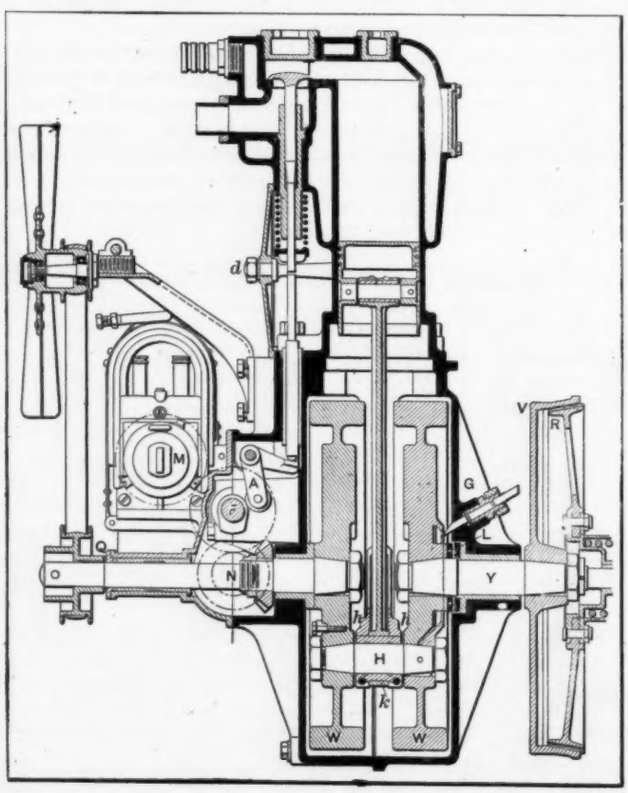


Fig. 2—Section through one of the cylinders of the 12-h.p. Lion-Peugeot motor

Renault for a valveless motor of a special type, but it is notable that the Renault firm does not yet authorize any statement to the effect that this type will be manufactured or has been found satisfactory. The fact remains that the trend is in the direction of lighter motors and the chances are that the activities of the present will lead to certain improvement before the end of the chapter.

Ordinary electric storage batteries give but small voltage, ranging from 1.8 to 2.4 volts, and the iron-nickel batteries even less, so that it is necessary to place a large number of elements in series in order to obtain high tension. But now a high-tension element has been invented by Mr. Gross, a teacher of music at Christiania, Norway. *Elektrophysikalischer Rundschau* publishes curves representing the discharge of the first Gross element and of a subsequent improved type. The first element weighed 1-2 kilo, and was discharged at the rate of one ampere. The initial tension was 55 volts, but at the end of ten minutes this had fallen to 24 volts, after 20 minutes to 16 volts, after 30 minutes to 12 volts, after 40 minutes to 10 volts, and finally, after one hour, to 8 volts. The construction was therefore not practical. But the improved type gave better results. It weighed 2 kg., and was in the form of a cube 140 mm. (7 1-3 inches) high. The initial tension was reduced to 26 volts, but at the end of two hours of discharge the voltage was still 23. This element yielded 20 watt-hours per kilogram, being in this respect inferior to lead-lead batteries, as used in public cabs, which yield 35 watt-hours. Later information indicates that further improvements of the Gross battery have been effected, especially that the output is now superior to that of older types, while the voltage remains considerably higher. A rapid discharge battery, convenient for experimental work, may thus soon be available.—*L'Automobile,* June 25.

A remarkable flight with a monoplane which has not been recorded in the aeronautic journals took place on Saturday, June 25, last. The Belgian aviator, Gaston Goffaux, rose with the "Belgica," a monoplane of his own design, at St. Job, near Brussels, while the wind blew at the rate of from 15 to 22 meters per second (which equals a mile in 80 seconds, maximum). Terrible gusts swept the field. During the first trial, which lasted 25 minutes, the monoplane maneuvered peaceably at a height of 100 meters, without apparently being in the least disturbed by the unceasing onslaughts of the angry atmosphere. Accordingly as the aviator headed the wind or went with it, his speed diminished till it seemed the machine hung motionless in the air or, on the contrary, burst into a dizzy velocity. But its stability asserted itself so remarkably that two spectators did not hesitate to join the pilot in a second experience. One of these new passengers weighed 85, the other 100 kilos. Mr. Gaston Goffaux promenaded them around in the tempest for ten minutes at a height of 50 meters, cut out his ignition several times and took them back to the ground in gliding flight. The monoplane in question has flexible wings, and here lies, it seems, the whole secret of its tranquil resistance to the violent air currents. Its inventor has decided to fly from Ostende to London, in the first days of August. "I don't believe," adds the writer, "that I have ever written you anything which equals in importance this dry and astounding report of one flight among a thousand."—Henry Kistenmaeckers, in *La Vie Automobile,* July 16.

The thrust of an atmospheric screw propeller, whether constructed with true helical pressure surface or with the preferable curvature of 1-14 or any other curvature, is always the same for the same torque of the shaft, and tests made with a propeller *in loco* are therefore sufficient to establish its qualities. It is not necessary to undertake costly arrangements for trying it at varying forward speeds, but it is desirable to test motor and propeller together. While the rotary speed of the screw increases with forward speed, the angle of incidence against the air is at the same time reduced, and the thrust remains unchanged.—From calculations by C. Eberhardt in *"Theorie und Berechnung der Luftschrauben."*

Don't

WHEN A PATIENT IS AILING THE DOCTOR DOES NOT APPLY ALL THE REMEDIES KNOWN TO "MATERIA MEDICA" IN ORDER TO MAKE SURE OF HAVING APPLIED THE RIGHT ONE. A PROPER DIAGNOSIS IS OF THE FIRST IMPORTANCE—SO WITH AN AUTOMOBILE.

Don't be selfish; if you have had trouble with your car and the remedy you applied proved to be efficacious, be generous; take the time to tell your brother autoist how it was accomplished. THE AUTOMOBILE will furnish the means of transmission. Write to the Editor—on one side of the paper only—setting forth the facts.

Don't imagine that literature is what is wanted in a matter of this sort; facts are most in need; literature can be purchased at a book store for a small sum; facts are as scarce as chicken teeth.

Don't imagine the character of trouble that you experienced is too trivial to tell about; if it gave you a bad half-hour, then, by telling the other fellow, he will be favored.

Don't become superstitious when your motor fails to work. The patent medicine man takes advantage of just this fault in man. It is easy to imagine that one is ailing from every disease under the sun after reading a patent medicine advertisement—it may only be a hankering for a dish of ice cream.

Don't purchase an automobile without considering what it is to be used for; a banker would scarcely want to be taken to his place of business in the morning on a five-ton truck. The trouble that some autoists have is due to having selected the character of automobile that fails to accord with their needs.

Don't part with your money until you find what you want—just the right kind of a car is available somewhere—get it.

Don't forget solid gold hunting cases do not always house good watches. While it is wise to let your wife select the body, it will be a good stroke on your part to examine the works.

Don't purchase real estate without having the property and its title examined. Why go at it blindly when you put an equal amount of money in an automobile?

Don't purchase a pocketbook with your last cent. If you cannot afford a road locomotive, and the cost of maintaining it, buy the kind of automobile that will take you where you want to go every time you have to make the journey, at a cost well within your income—just such automobiles are to be had.

Don't imagine you were skinned if you find that the car you selected is not what you wanted—the salesman is not a fortune-teller.

Don't expect the salesman to drive you away from his door; he is there to sell you his make of car; not the make of his competitors.

Don't expect a runabout to go as fast as a touring car. It is prejudicial to the life of the runabout to force it to trail a touring car. Be content to drive leisurely. The scenery along the roadside is superior to the dust thrown up by the car ahead—fall back.

Don't forget to "sniff" if a salesman paints a cabbage to look like a rose. If he deceives the eyes, rely upon the nose.

Don't drug your good judgment by a "plethora" of extras on a car; what you need is a good automobile; make sure that you have the foundation even if you have to do without the extras. Lamps are used to illuminate the space ahead, not to provide the means for going ahead; the lamps will be of no use if the car is faulty.

Don't make the mistake of stopping at a saloon for gasoline; the kind they keep in such places would burn the lining out of the tank.

Don't keep a chauffeur twenty minutes after you find that you can dance a jig upon his breath. A befogged brain makes a bad steering wheel.

Don't try to overcome the ills of poor springs by running on partially deflated tires. Slow down to the speed where the springs will do the work. The tires will give out too soon if they are not kept inflated.

Don't race with other autoists on the road; you become a criminal by subjecting your automobile to criminal abuse even if you do not maim or kill a citizen.

Don't contest the right-of-way with a locomotive; when you come to a railroad crossing stop (if necessary), look, and listen.

Don't use your muffler cut-out as a means of telling the public that you own an automobile. A better way is to stand on the corner and politely inform the passers-by of the fact; be sure and clearly state the make, model, horsepower, from whom it was purchased, and the cost.

Don't look with disdain upon the fellow who elects to walk; he may be just as able to buy tires as you are.

Don't let "Financial Apaches" get away with the story that you mortgaged your home to purchase an automobile.

Don't be sarcastic. If you are able to afford a more pretentious looking car than your casual acquaintance, what of it? No man ever stole to be poor.

Don't argue with a policeman; if you take umbrage at his nationality, remember that he was not consulted; remember also that it is the law he represents—his duty is to call your attention to the defect which resides in your interpretation of the same.

Don't imagine that the Legislature made a mistake in printing the Law, making it read 30 miles per hour instead of 45 miles per hour—the printed figures are probably right.

Don't mope along the road until you come to a corner and then press the accelerator; it may be exciting to go fast on a curve, but the nights are long in a hospital ward.

Don't put a 20-horsepower horn on a 10-horsepower automobile and deceive yourself into believing that you are doing a mile a minute; remember the public; it, too, has ears and a sense of the fitness of things, even if you have not.

Don't fill your gasoline tank at night with the lamps lighted; were it not for the fact that gasoline is quick burning and energetic, the automobile would not run. The piston in the cylinder of the motor is quicker than you; it manages to get away; you may not succeed.

Don't spill as much gasoline on the ground as you put in the tank; it is not only extravagant, but it is dangerous.

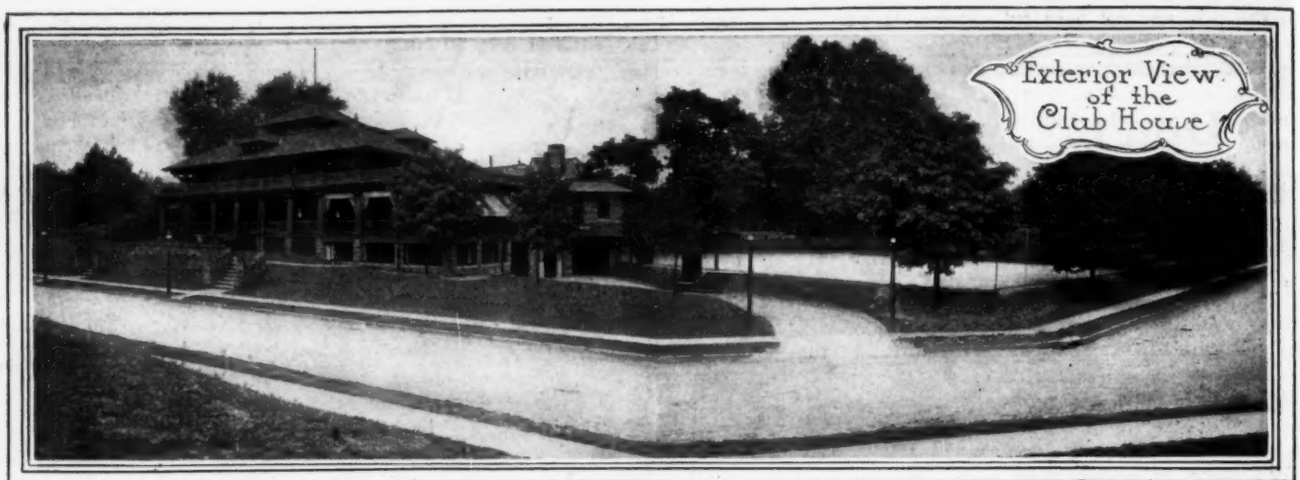
Don't think you can make an automobile go without gasoline; when the motor stops, look in the tank.

Don't reach the conclusion that a full tank is absolute assurance that the gasoline gets to the vitals of the motor; there may be a wad of waste in the piping system—as Maude Adams said, "It 'as been 'erd uv."

Don't reach the conclusion that every cell of the battery is in good order just because you find one cell to be so; test each cell; eliminate the "dead" one and be happy.

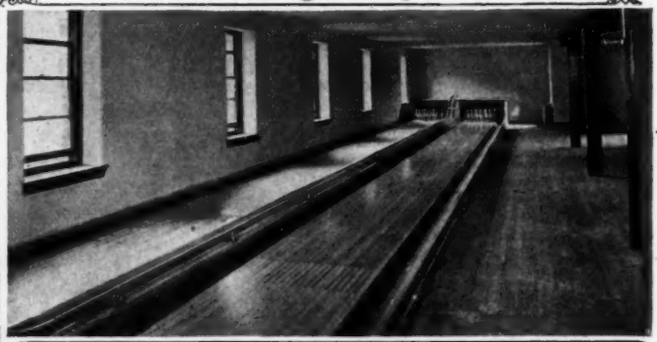
Don't neglect the auxiliary ignition system for months just because the magneto is a willing worker; even a giant is likely to catch the "grippe."

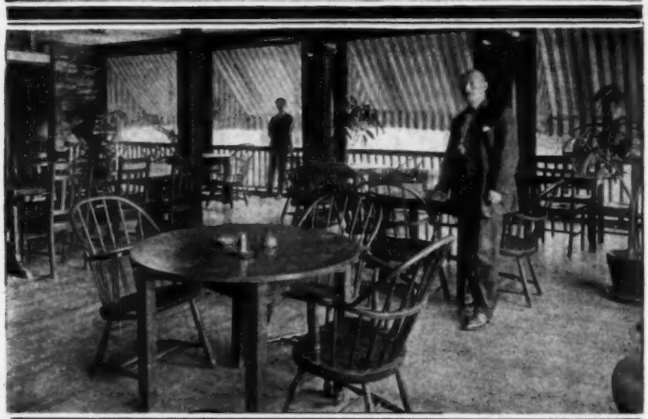
Don't press down on the starting crank; a friend of ours is now sporting a broken arm from this cause; 56 per cent. of all accidents are due to this practice. Pull up (smartly) on the starting crank; let the flywheel do the rest.



Garage

Bowling Alleys





Veranda Dining Room

The Automobile Club of Germantown

AWAY back in the Dark Ages of motoring—in 1901, to be approximate—ten residents of Germantown, Pa., who owned automobiles, experienced a pressing need for a common garage. They were all men of wealth and prominence in business, social and professional life and when the idea took concrete form, they were not long in giving it definite expression. This expression took the shape of renting the old fire house, located on the Germantown road, and in this ancient building the members of the little syndicate housed their cars.

Thus was born the Automobile Club of Germantown, which stands unique among the automobile clubs of the United States in several particulars.

The cars owned by this little group of motorists would make a strange appearance to-day lined up in Fairmount Park or along Riverside Drive. There were expensive foreign automobiles among them, one in particular having wheels almost as high as those of a buggy; there were curious, asthmatic steam cars of types long dead; racing machines of very moderate speed as judged by the standards of to-day and generally the cars bore characteristics that have been eliminated in present construction.

In order to show how fast has been the development of the automobile since 1901, the fact may be cited that one of the first runs of the club was to Trenton, N. J., and return, a distance of about 50 miles. This was accomplished within twenty-four hours by most of the members. To-day the same run could be made in three hours, without doing anything unlawful or out of the ordinary.

But in that day the "big" tour of the Germantown motorists caused quite a little stir and really marked a step in demonstrating the utility of the automobile.

But the club was not born full-grown. It was at least two years after the period in which the fire house was rented as a garage before the members decided to add a club feature to their project. Letters to leading enthusiasts were sent by the originators of the idea and almost immediately flattering results became apparent. They were invited to ally themselves with the pioneers in an incorporation pledged to build a pretentious clubhouse and formed with the idea of making the pathway of the automobile more pleasant.

Great care was taken in selecting the members and a cast-iron limit was placed upon the membership rolls. While from the very nature of the club money was a secondary object, the financing of the whole project was done with all the skill and finesse known to the world of business. This was possible because the men who formed the club were of the most advanced types of business men and professional men.

The records of the club show that an astonishingly small amount of actual money was necessary to launch the project and from that small beginning the physical assets of the club to-day have increased to more than $60,000.

The first step in the way of progression was the acquisition of a magnificent site for a clubhouse, hard by the Pennsylvania Railroad station at Carpenter. Prescott Adamson was chosen first president of the club, which assumed the chartered name of the Automobile Club of Germantown. In 1904, the original building was completed and the club took possession. It sat upon a little hill and its walls were of rough stone. On the level of the road a cemented garage was built, occupying the whole basement of the clubhouse. The main floor consisted of a veranda running the full length of the structure, ending in a wide, open-air dining room. Inside was the lounging room, kitchen and storage rooms of various kinds and a commodious hall for dancing and social functions. Back of the social hall was a suite of rooms devoted to the ladies. These rooms were delicately and delightfully furnished and fitted with sumptuous elegance. Upstairs were the baths, billiard and pool rooms, directors' room and the living apartments of the chef.

Back of the building the club installed tennis courts of perfect construction.

For several years these quarters and arrangements were adequate, but last year it became apparent that the club would have to have more room. This was supplied by an addition to the clubhouse which has recently been completed at a cost of about $15,000. The addition gives the club one of the finest bowling alleys and billiard rooms, similarly situated, in the country. It enlarges the culinary department, so that the eyes of Jules J. Dirac, the major domo and master of ceremonies, shine when he discusses them. It increases 100 per cent. the garage facilities; doubles the bathing accommodations and brings the clubhouse plant right up to the minute in every convenient way.

The building as it stands to-day is vastly larger than it appears. It is 180 feet deep by 125 feet long, and every detail has been supplied with the idea of accommodating its members.

Mr. Adamson was re-elected to the presidency after his first term and was succeeded in office by Thomas B. Prosser, who served two years. Then Robert P. Hooper was chosen head of the organization and for three years he has conducted the administration of club affairs.

The organization, as noted, has several unique distinctions. Its object, according to its constitution, is "to maintain facilities for the sport of automobiling and other innocent or athletic sports and for the purpose of maintaining a club for social enjoyments and for the development of social intercourse."

From September 15 until after Ash Wednesday the clubhouse is the scene of social activity several times each week. The cuisine has gained a name for itself, and at this time, when a majority of its members are traveling or enjoying recreation abroad or at American summer resorts, the memorandum book of Mons. Dirac contains numerous orders for formal dinners to be given next winter. The ladies take advantage of the facilities offered by the club, and bridge parties, luncheons, dinners and dances are being scheduled now for the coming season.

The Automobile Club of Germantown is the only organization of its kind that has a bona-fide "waiting list," as far as data at hand shows. Applicants whose names have been favorably acted upon by the governors are obliged to wait until a vacancy exists before being received into full membership. As a result, it means something to belong to the club.

While the club is a negligible quantity so far as racing and hill-climbs and contests are concerned, it is a power in other ways. Its roster contains the names of men whose membership spells power and progress. It works through the Pennsylvania Motor Federation in State-wide matters of importance to motordom, but takes small part in the administration of such matters. It is said of the Automobile Club of Germantown that when it comes to the important matter of settling the bills or providing finances for big matters touching close to the heart of the pleasure of motoring, its position is unassailable. When a job of sign posting has been done or when the legislative committee of the State body wishes to push some important legal matter, the Germantown organization always "comes to the front handsomely."

Now as to the details of the club: The garage has space for forty-eight automobiles and there is a waiting list for such space as "long as one's arm." The club goes in for billiard and pool tournaments, tennis matches and tournaments, bowling and various other contests outside of motoring. Its list of honorary members includes the names of the clergymen of Germantown, who frequently take advantage of the club privileges.

Aside from Mr. Hooper, who is president of the club and who says that after the current year, when his term expires, he will retire to a plain membership, the officers of the club are as follows: Vice-President, Clifton H. Wheeler; secretary and treasurer, Stephen B. Ferguson; chairman of the house committee, Dr. Edward F. Kamerly; garage committee, William R. Harper; automobile affairs and entertainment, Clifton H. Wheeler; membership, Stephen B. Ferguson; bowling, W. T. Betts; billiards and pool, Dr. Herbert P. Fisher; tennis, James Poole Hooper, and good roads, Charles H. Thompson.

Robert P. Hooper is also president of the Pennsylvania State Motor Federation and several of the officers of the club are active in its councils.

Coming Events in the Automobile World

Dec. 1	Chicago, Ill., First Annual Aeronautical Exhibition in the Coliseum.
Jan. 7-14, 1911	New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Manufacturers.
Jan. 16-21, 1911	New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A. L. A. M.
Jan. 28-Feb. 4, 11	Chicago Coliseum, Tenth Annual National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Pleasure Cars and Accessories, Exclusively.
Feb. 6-Feb. 11, '11	Chicago Coliseum, Tenth National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Commercial Vehicles, Pleasure Cars, Motorcycles and Accessories.

Races, Hill Climbs, Etc.

Aug. 16-27	Munsey Tour.
Aug. 23	Cheyenne, Wyo., Track Meet.
Aug. 26-27	Elgin, Ill., Road Race, Chicago Motor Club of Chicago, Ill.
Aug. 31	Minnesota State Automobile Association's Reliability Run.
Aug. 31-Sept. 8	Kansas City, Mo., Reliability Run, Auto Club of Kansas City.
Sept. 2-5	Indianapolis, Ind., Speedway Meet.
Sept. 3-5	Run and Labor Day Race Meet of North Wildwood Automobile Club.
Sept. 7-10	Buffalo, N. Y., Reliability Run, Auto Club of Buffalo.
Sept. 15	Algonquin, Ill., Annual Hill Climb of Chicago Motor Club.

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AMONG communications from autoists, as they come to the Editor from time to time, there are quite a number of the character that indicate more or less dissatisfaction. Some of them speak unkindly of two-speed transmission systems, but we note that they hail from mountainous districts, which rather goes to indicate that the purchasers themselves were lacking in judgment. Every purchaser should know that there is no sense in going to the expense of placing a transmission gear in an automobile if it is not there for a purpose. No automobile should require a transmission gear on a level hard road; the flexibility of the motor should be sufficient to permit of running the car fast or slow at the will of the driver under all hard road conditions.

* * *

WHEN the road becomes soft, or the grade exceeds 1 or 2 per cent., the flexibility of the motor begins to peter out and the necessity of the transmission gear arrives. Just how many speed changes are necessary under bad road conditions depends upon how bad the road is. It would be an error in judgment in all probability to attempt to brave Pike's Peak in a small car fitted with a two-speed planetary gear. Would this be the fault of the planetary gear, or should the difficulty be charged up to Pike's Peak? It is scarcely to be expected that anything would be gained by attaching the blame to either the planetary gear or Pike's Peak, nor can the purchaser evade the consequences.

IF it is an error in judgment to attempt too much with a runabout, the only remaining question is whose judgment is at fault? Common law presents the dictum "Let the buyer beware" (*Caveat Emptor*). Every business man acting in his normal capacity understands this legal situation perfectly. Why should he disregard this basic principle in law when he goes forth to select an automobile for his own use?

* * *

NOTHING thus far set down can be construed as giving the seller the right to perpetrate a palpable fraud. Misrepresentation of the deliberate and premeditated sort is not authorized by law, but failure to point out incapacity for the purchaser's service cannot be construed as misrepresentation. The vendor, in offering a machine, necessarily takes into account the character of machine he has to sell, nor can he be expected to waste any time upon the vendee's question of service, unless he sees fit.

* * *

THE most successful companies in the world are numbered among those which do take the greatest possible interest in the ability of their wares in service, and the absolutely gilt-edge commercial companies positively refuse to permit their wares to go out without knowing what they are to be used for, or without knowing whether or not they will serve properly in that service. This policy works out in the automobile business just as it does in other commercial pursuits, and in the long run when the roll call of the survivors is concluded it is not believed that there will be one among them if its policy is based upon *Caveat Emptor*.

* * *

ONE of the points brought out at the Summer meeting of the Society of Automobile Engineers referred to the "cold end" of the pyrometer as used in heat treatment work. If indications are reasonably conclusive, the chances are that quite a number of those who rely upon pyrometers for the proper determination of heat-treatment temperatures neglect to maintain the cold end of the pyrometer at the melting point of ice (0 degrees centigrade). In the article on pyrometers now running in THE AUTOMOBILE it is clearly indicated that failure to maintain the proper temperature of the cold end results in the maluse of the instrument.

* * *

IN attempting to get away from the so-called "rule of thumb" practice of the old line shop man, it will be well to substitute something more accurate than that due to experience. The old-fashioned manipulator of the heat treatment equipment has a keen eye, and he makes up in cleverness for the defect in his empirical method. Substituting a pyrometer, if it is not properly employed, constitutes the most direct method by which a poor result may be obtained.

* * *

IT will be a step in the right direction if the various makers of automobiles will afford to their engineering staff an opportunity, including the necessary time, to become thoroughly acquainted with the instruments of precision they are supposed to employ in their regular work. the pyrometer being but one of the number.

Economics

DEALING WITH THE FUTURE PROSPECTS OF THE AUTOMOBILE INDUSTRY, DISCUSSING NEW FIELDS AND MORE THAT HAVE BEEN BUT POORLY WORKED, IF AT ALL

DESPITE the pessimistic views of those who least understand the automobile business, but have the most time available for its discussion, the future of the industry is on a settled basis. There are dozens of fields that are crying for attention. Moreover, it will be some time before the makers of automobiles will have an opportunity to work into the newer fields. Take, for illustration, the question of fire department equipment. Every fire department in every city and town in the land will adopt the automobile sooner or later, and the only reason they have not done so up to the present time is because they could not get the equipment.

* * *

WHEN a fire breaks out its automatic progress is picturesquely startling, and the amount of damage a first-rate fire will do in a short time greatly exceeds the rate at which money can be drawn out of a bank by a panic-stricken mob of depositors. It is a little difficult to quench the thirst of a depositor for his money in the face of a panic, but a fire responds to prompt application of stout streams of water. It will be understood, however, that promptness is of far greater virtue than water when a fire is to be quenched, and the automobile type of fire-fighting equipment is conspicuous for its ability to serve with dispatch.

* * *

IT is a matter of absolutely no consequence as to the first cost of the fire apparatus; the sole argument worth taking into account has speed for its foundation. Automobile fire apparatus is inherently endowed with speed, nor is it less capable in the measure of the streams it will throw when the scene of action is reached.

* * *

AUTOMOBILE makers are not waiting for municipalities to awaken to the virtues of automobile fire-fighting equipment; the reverse is true. Enlightened municipal officials are doing their best to procure the equipment; they will have to wait until automobile makers have time to produce it. Fire Commissioner Waldo, of New York, having investigated the virtues of the automobile type of apparatus, endorses it in all its phases, going the length of stating that gasoline underbids oats when it comes to cost. Announcing that bids will be advertised for a quantity of automobile fire equipment, the most progressive Fire Commissioner that the City of New York has honored for a long time expresses the hope that every engine house in the "Five Boroughs" will soon be equipped with automobile fire-fighting apparatus.

* * *

ALL the fire departments in the land, were they to be equipped with automobile apparatus, would fall far short of the necessities if the automobile business is to continue and prosper. The value of the equipment required for Greater New York, for illustration, might be put down as $100,000,000, which is a comfortable sum, but small, as the automobile business is measured. If fire departments are efficient to the extent that they save property, they are no less valuable to the community at large than the equipment employed in the cleaning of streets. The mortality in a great city is only kept down by everlasting vigilance and municipal cleanliness, which calls for efficient equipment.

* * *

THIS field, from the automobile point of view, is virgin, but it is large, and fortunately for the makers of automobile equipment, the contractors who handle this class of work are under the influence of the opiate which is extracted from lack of knowledge. When these contractors discover that they can do more and better work at a lower cost, using automobiles, than they can in the old way, the automobile industry will have at its disposal a coterie of willing purchasers, who will look upon automobile salesmen as mere obstructionists.

* * *

MUNICIPAL work is by no means the basis for the substantial outlook of the automobile industry. It may not be generally understood, for instance, that 25,000 tons of coal are handled daily in the City of New York by automobiles; there is no telling what the demand will be when contractors in general become acquainted with the facts as they are.

* * *

FORTUNATELY, inertia must be overcome before the demand will spread and become general, but it is a pitiable sight to call at the training camps of the army, there to observe that transportation is scarcely different from that which obtained with Grant in the Wilderness. But the army mule will have to go, although it is possible that the situation will not become acute until the mule's friend is placed securely upon the retired list. So far as the automobile business is concerned there is no hurry at all. Besides, the mule régime in the army has been one of conspicuous and honorable service.

* * *

IN the meantime, foreign armies are taking very kindly to automobile forms of transportation, and headway is being made at a rapid rate, now that immature and foolish ideas are being eliminated. During the creative stage the men who had charge of this class of work, although they knew that horse-drawn vehicles were incapable of supporting armor-plate, did not have the sense to understand that automobiles are substantially in the same fix. The natural inference was that automobile trains for army work would fall short of the best requirements, as measured by the standards of the day, unless they could be made bomb-proof, although the men who established the standards made no attempt to state how they would fasten armor to horses and obtain result.

Communications

AT THE CROSSING OF THE WAYS BY AN OBSERVER; WANTS TO AIR A GRIEVANCE; TAKES UMBRAGE AT A HALF-BAKED PLANETARY GEAR; MAN WANTS TO BECOME A CHAUFFEUR, ETC.

At the Crossing of the Ways.—Pedestrian was angry. The bluecoat ruler of the traffic has whistled when Pedestrian was in the middle of the crossing. The taxicabbies and chauffeurs had driven ahead as if Pedestrian did not exist. He had been obliged to jump to reach the sidewalk and his dignity was ruffled; in fact, he was red in the face and trembling with rage. "The pack of ruffians," he mumbled audibly, including the bluecoat and the whole automobile world in one sweeping glance of denunciation.

The man who conducts an automobile is not always highly considerate. But he bears comparison smilingly with the high-perched teamster whose quids and invectives hit where they may, with the wanton spitter from rear platforms, with the hustler of packing boxes and with many others whose ready insolence springs from the possession of tools that may be turned into arms as deadly as the automobile. Even in a round-up of policemen and chauffeurs it may be doubtful if there would not be as many polite ones among the latter as among the guardians of peace who draw pay for being helpful.

Pedestrian himself, when his rage brims over, intimates what *he* might do to help the situation if he were equipped with means for holding his own against the superior momentum of the offenders. Moved with compassion for manufacturers of whips who have lost much trade since the automobile came in vogue, he might unite with himself and form a society for the popularizing of the combined walking stick and *chambrière*, or he might prefer the rawhide dog whip, and whenever a cocksure driver of the hated automobile threatened his ambling leisure he, too, would draw arms, presumably. Oh, but what a smarting slash would mark the cheeks of that chauffeur! Or, Pedestrian with a real grievance, and studying for vengeance and prevention, might discover that shining little steel pellets, exact spheres within 1-500 of one inch, though not good enough for automobiles, may be bought for 30 cents per thousand and, handy from the pocket, would make excellent missiles, carrying a message of chastisement to the facial cuticle of his foes. A *corpus delicti* would be almost as hard to find as an absconding witness in a political trial.

Between retaliation in kind and religion in spirit the resources of Pedestrian are by no means exhausted. Philosophically he may set himself the task of deciding which end of his dilemma will cause the lesser amount of vexation. Then, too, he may follow the example of the intelligent Sarah Bernhardt, who as early as 1900 detested automobiles and forthwith mortgaged her next performance and bought a car for the proceeds. She was as wise as Mohamet who went to the mountain when it would not come to him.—Observer.

Wants to Air a Grievance.—As you appear to be entirely willing to discuss any questions your readers bring up, I will air my grievance. Will some one kindly explain why it is that although the manufacturers of motor cars keep on steadily improving their machines in every other way, none of them ever think of improving the pan under the engine, but continue to use the same pattern of mud pan as Nebuchadnezzar used on his chariot? Of course. I cannot swear that every machine manufactured is deficient in this respect, but every one I ever had any experience with is the same way—a roughly and poorly constructed sheet of sheet iron fastened on with hooks or clips, there being only one job on earth harder than removing it, and that is getting it back on again. As for the pan on my own car, I couldn't express my opinion in language fit to go through the mail. A number of these monstrosities get bent all out of shape by the time the car has been run two or three thousand miles, and scrape against the flywheel or other parts of the motor. It always looks to me as if this was a place that they were compelled to cover in some way and were at a loss to know how to do it and accordingly were obliged to let it go through with the first makeshift device that came to hand.

I don't know about the auto users in general, but for my part I would gladly pay a little more money on my next car and get a part constructed to fit its place in this section of the car instead of a thing resembling a piece of tin roof after a bad fire. There does not seem to be any reason why the pan cannot be constructed to retain its shape, either by making it of inflexible material or building it over a light, stiff frame, and also to make the front portion of it to fit into grooves or over lugs so that it may be put back into position without the aid of a surveyor and a crowbar.

This may seem like a silly kick, but I feel sure that there are plenty of people driving cars who feel the same way about this as I do, and I do sincerely believe that in at least fifteen makes of machines, and probably others, there is a pan provided that ought to be legislated against.—R. W. McDowell.

Takes Umbrage at Half-Baked Planetary Gear.—Will you allow me a little space to record the very low opinion I hold of some planetary gears?

I have often wondered why makers put some of these contemptibly inefficient gears in automobiles costing so much that the extra cost of good gears would not increase the cost of the car more than 5 per cent. Some makes are different, and give satisfaction; but I have one of those cars whos surname might well be Blarneyite, but isn't, and whom Mr. Unoften accuses of not paying royalties on the Unoften patent. Well, it is the third car I have owned, and I would not give 30 cents on the dollar for my choice of his whole output, if I had to take the ensemble of the planet along with it in the shape of a transmission.

How is it a nuisance? In more ways than an ingenious inventor of fiction could imagine. In the first place the noise of the low gear is like unto the dumping of a garbage load of tin cans. An editor of a leading automobile journal has said that a motor car is worn out when it gets on the nerves of the owner. Measured by that criterion, my car has already enjoyed twice seven lives. Again, the gears require constant adjusting. I have to tighten up the low in order to climb a hill, and, if I get it the least too tight, the high drags so that I can't climb any kind of a grade until I loosen the low. Also the high requires frequent adjustment regardless of the condition of the low. As a Pandora's box of troubles carries off the whole peach crop of Oregon.

And to think it's just because the maker wishes to squeeze a little more profit out of his cars in addition to the royalties he is beating Mr. Unfrequent out of. I was talking to a physician lately about what cars are the best to buy to-day. He is also the owner of a screecher, and he said he wouldn't buy another. We were unanimous on that point, and both our objections were founded on the transmission. He spoke of a neighbor of his having another, and said that he could hear that neighbor leaving for his office every morning. I had had a neighbor whose morning departure I could also note, and, at times, his going was the cause of my waking. Say what you please about light cars needing only two speeds, but take my word for it that any car which is intended to road it in this section needs a very low gear—I would call it an "emergency low." Two gears are usually enough, but it is the unusual happening that causes the motorist to hire a team once in a while and that costs money.—S. Ross Parker.

Mester Editer.—Jag vant yob for shofer. En Salvation lady. vant me vork for salvation men jag sa: No, jag vil work shofer. She sa: You vork shofer och vork for salvation samma time. Jag sa: No, no man kan vara shoper och vork for salvation a samma time.

Jag ban til shoper schoola samma time ven jag vore in hospital met en broken leg. Jag ban marrit tirty year och jag er sober man yet. Jag vork met mashiner somme time. Jag see man draiv kar ofver bank, men jag know ven to turna hveelet. Jag har drifvet oxen. Jag kan vorka unner car. Jag haf dig ditch unner hous. Jag vant goot yob met fine close och blanka buttons. You get me yob for shoper, och jag gif you mit pikter som jag yoost haft takit.—Eric Ericsson.

Expert's View of the Trade.—There is no question but that a certain amount of anxiety that has prevailed all along the line within the past two months in the automobile industry, has been justified but the conditions which have brought about this anxiety have been the logical result of a certain trend of events which have not been under the control of the automobile manufacturers. In the past, the automobile business has been a season business, (i.e) the manufacturer attempted to build a large number of cars in two or three months during the selling season, with always the same result—that it was found absolutely impossible to fill orders.

This year the majority of manufacturers ran their plants at full force during Fall and Winter, storing up some cars with the expectation of being able to come nearer to filling orders during the Spring season by drawing on this storage stock. Without doubt this would have been a wise move had it not been for the exceedingly inclement weather that prevailed during the Spring and early Summer months and which made it impossible for the agent to dispose of cars, as he could readily have done had the weather been normal.

The factories, however, have been running at full force until this year's production was practically completed, which in most cases was much sooner than expected, owing to the early start made by the different companies. This, therefore, necessitates a temporary decrease in the number of cars produced daily by the manufacturers until the 1910 season has been ended and until they can get ready for the 1911 models.

The banks have discouraged the farmer and the small agent by refusing loans on anything pertaining to automobiles. The wonderful crops in the west have enabled the farmer (and, of course, the people he comes in contact with) to buy automobiles without recourse to the bank and, as the farmer looks upon the automobile now as a necessity and not with the feeling of antagonism shown in former years, there is no question in my mind but what the Fall purchases of machines will be greater than ever before known.

I am confident that the 1911 season will see more automobiles manufactured and sold in the United States than ever before.—Fred W. Haines, General Manager of the Regal Motor Car Company.

Why Country Bankers Object to the Automobile—We hear a great deal nowadays of the non-productive capital which the money invested in automobiles has withdrawn from useful purposes. It is true that the depreciation on an automobile must necessarily represent a shrinkage which cannot be overcome, but aside from this natural depreciation, do not the dollars and cents put in automobiles represent vast industries, with well-paid workmen, skilled mechanics, intelligent salesmen, and enterprises radiating from this business through hundreds of different channels and industries?

We have 70 agents in the United States. A careful investigation of our retail business reveals not a single instance of a car sold, where the funds had to be derived from a mortgage, either of the car, or upon the home of the buyer in question.

Investment security sellers, small town bankers and stock brokers are not blaming the automobile as a source of injury to the country, but simply because they can point to the heavy purchase of motor cars as the item which has affected their individual profits, and a great many people are apt to judge the welfare of their country by their individual affairs.

Take, for instance, an Iowa town, of, say, 2,500 people with a rich farming community contiguous. You will find say six banks, with aggregate deposits of $500,000. This, I think, is considered a good average. Good banking calls for at least 25 per cent. of this to be kept in reserve, the remainder no doubt being loaned out on farm mortgages, live stock, term notes or high-grade investments. The reserve, though, was very seldom kept at home but a very considerable portion of it is invested in Chicago, St. Louis, Des Moines or Kansas City banks in the shape of deposits upon which they receive between 2 and 3 per cent. interest.

In such a country it has been no uncommon thing for 100 automobiles to be placed in one year. A safe estimate would average the cost of these cars at $1,000 apiece, or a net total sum expended on motor cars of $100,000.

It is, therefore, obvious that the deposits in the six banks referred to above have shrunk $100,000, and the money left the community. Since the money has merely been transferred to some manufacturing center, there is no loss in the country. The local financiers, though, have lost all but $25,000 of their reserve and instead of sitting back complacently as a depositor in Chicago, St. Louis and Des Moines banks, and drawing 2 to 3 per cent. interest on the other fellow's money, he is forced to go to the same bankers and borrow exactly the same amount that has left the community and pay generally between 5 and 6 per cent. for it, or curtail loans, and hence earnings.

It is, therefore, apparent that nobody has lost any money except the banker. His business is not as profitable as it was before, because his depositors are not keeping the idle money in his bank, and he is not getting the use of it.

History shows that every tremendous step forward that the world has taken has been due to some radical improvement in transportation. The Roman carts subdued the Pagans. Napoleon's swift marches overran Europe; the steam engine and the steamboat made America and the United States, and without them, St. Louis and Chicago would still be fur-trading posts. So also to its own degree will the automobile revolutionize transportation, improve farm values, and create untold benefits, and it is hardly justice to the automobile industry to hold up the few exceptions, as horrid examples and blame the automobile for conditions which it is not responsible for.—Joseph W. Moon, president Moon Motor Car Company.

Automobile Vogue Menaces "Confidence" Industry.—In the current issue of *Farm Machinery*, a publication devoted to the interests of that trade, a leading position is given to a symposium of alleged and anonymous bankers on the subject of the danger that menaces the financial, moral and political existence of the country through the vogue of the automobile.

Half a dozen bankers who have grown so used to drawing down 2 or 3 per cent. on legal reserve have forgotten that depositors still have the right to do as they please with their own property, and bewail the fact that the depositors have withdrawn this surplus money.

But one banker from Keokuk, Iowa, told the truth, even if it was an unpalatable mouthful. He is quoted as saying: "Money formerly lost in speculation in mining and other worthless stocks is now invested in automobiles, and this city now has one automobile for every 100 of population."

This should prove a valuable pointer to industrious "con" men who contemplate a campaign in that delightful section of the country. If the general public has advanced so far along lines of worldly wisdom in Keokuk, that it prefers the sensation of riding in an automobile to the desperation that follows investment in fake securities, lighting rod contracts or even the feeling of misery that results from failure of banks following the unsuccessful speculation of the bankers in Wall Street or elsewhere, it is time to seek other fields.

The automobile undoubtedly cuts out funds that might feather the nest of "green" goods swindlers, but the fact should be remembered by the bankers and green goods men that the owner of the money may do with it what he pleases and the record shows that he pleases to play with the automobile rather than to furnish "fat" for the carrion buzzards who so long enjoyed unearned the fruits of his labors.—Reviewer.

The Munsey Run

HISTORIC TOUR STARTS FROM PHILADELPHIA NEXT TUESDAY. WILL BE THE MOST IMPORTANT ENDURANCE TEST OF THE YEAR. ROUTE LIES THROUGH TERRITORY RICH IN HISTORIC INTEREST AND SCENIC BEAUTY.

OVER a route laid out through ten States, which saw a large part of the history-making events of the early days of the Republic, the Munsey Historic Tour of 1910 will start from Philadelphia next Tuesday. For the next dozen days the long string of automobiles entered in the tour and contest will wind in and out among the scenes of struggles that are written immortally upon the tablets of the nation's remembrance.

The territory covers a thousand points of patriotic interest, the least of which contains enough of fascination to center attention in passing, while the names of a dozen of the more important points are sufficient to set the pulses thrilling. The route of the tour follows one road in New Jersey where Washington and his frost-bitten soldiers swooped down and captured two garrisons of mercenary troops, out-generaled the relieving columns of the British commander and faded away in the night behind the protection of unguarded camp fires. In another place it follows the route taken by Benedict Arnold in escaping to the boat landing below West Point, from which he succeeded in gaining the deck of the warship *Vulture*. It goes over the old Boston Post Road in Connecticut and through the historic territory of that State to New London, which was ravaged by Benedict Arnold, after he had taken up arms for the British cause, and thence through Rhode Island to Boston, touching a hundred spots of national importance in the formative years of the Republic and the scenes of numberless encounters with hostile savages in a still earlier period.

The very name of Boston is thrilling to the red-blooded American, no matter what section of the land he may claim as his home. There it was that the militant spirit of revolution was fostered; there it was that the Pilgrims landed about three centuries ago and there it was that the impetus of armed resistance to tyranny found expression long before the actual declaration of hostility against the injustice and aggression of George III. Bunker Hill and the glorious defeat sustained by the infant nation, in which the Americans discovered that their enemies were merely men and that the missiles of their squirrel rifles would make even the British regulars waver and run before their spiteful stings, will be particularly noted by the tourists.

From Boston the way follows the rugged coast of the Ocean, through New Hampshire and Maine to the city of Portland and thence striking westward it climbs through the foothills until the heights of the White Mountain country have been attained. Passing through the Green Mountains of Vermont to Burlington, the Sunday stop-over having been made at Bethlehem, N. H., the tourists will approach Lake Champlain on the seventh day of actual running. The course of this day's run is particularly attractive, as it is laid Northward over several of the islands in that beautiful body of water, to the upper end, where the cars will be ferried to Chazy on the New York side. Turning Southward, the tourists will proceed toward Saratoga over the roads used by Burgoyne during the invasion from Canada, in that ill-fated campaign that proved the turning point in the fortunes of the Revolutionary War. The cars will pass various points where the distracted British troops, decoyed farther and farther from their base of supplies, puzzled with false information and bewildered by forays of the Americans, finally yielded.

From Saratoga to Binghamton the way is through the land that was known as the "Bread Basket of the Nation." during those early days. It is the country that was settled by pioneer farmers long before the struggle for Independence and proved to be of marvelous fertility and agricultural potency. Dotted across the map of this day's run are the names of hamlets and localities that were the scenes of horrible Indian massacres.

Southward from Binghamton, the road is to Wilkes-Barre and the actual route of the travelers is via a stretch of highway that was built by General Sullivan and his Revolutionary soldiers during the campaign in which he had been commissioned to punish the Indians for an atrocious massacre inspired by the British and Tories. This bit of roadway was constructed with immense labor and while it is passable to-day, it will undoubtedly prove to be the most trying stretch of the tour.

Coming into the homestretch the tourists will leave Wilkes-Barre and the run to Harrisburg is one of the best scenic bits of the whole journey. The mountains of Pennsylvania are rugged and difficult and this portion of the run will give a supreme test to the cars entered, coming as it does after such a long and trying trip. The last day of the tour is to Washington, D. C., where the cars will be checked in. The total mileage is about 1550 and the whole route has been picked out with the idea of giving a wide variety of road experience.

Entirely aside from the historic interest of the tour, the contest feature as a reliability test of the automobile will be valuable and illuminative. Most of the roads are excellent, but enough stiff grades and difficult highways have been included to test the stamina of the entered cars.

The Munsey Tour is fathered and managed by the Munsey newspapers, *The Washington Times, Baltimore News, Philadelphia Evening Times* and the *Boston Journal.*

It is fully recognized and sanctioned by the Contest Board and this year has received a vast amount of attention from manufacturers, as is evidenced by the magnificent entry list. There are several more makes of automobiles represented in the list than contested in both divisions of the Glidden Tour of 1910 and a number of the leading contestants in that event will be found in the Historic Tour.

A spirit of fairness and consideration has been apparent in all the official actions of the management during the preliminaries. Everybody connected with the enterprise has been working to anticipate problems likely to arise during the run and to prepare to meet them justly.

The officials of the tour are E. L. Ferguson, of New York, referee; Technical committee, E. L. Ferguson, Joseph Tracy and J. A. Hemstreet, Harry Ward and M. M. Mauger, of the Munsey papers, will be in charge of the two pilot cars and Francisco Juarez Byrne, the noted Spanish-American author, will write the newspaper reports for the Munsey string.

From present indications there is not a shadow to darken the prospects for a successful tour. The route is ideal. It lies through a territory closely in touch with the great centers of population. It is sufficiently varied to give an adequate test of the machines without torturing cars and drivers and passengers. The officials are among the most competent in their line of business and the field is about as good as any that ever went to the post in a similar contest.

The entry list includes the following: Premier, Columbia, Maxwell (3), Washington (2), Reading "40", Ford (3), Elmore, Warren-Detroit, Corbin, Spoerer 1911, Brush runabout (2), Regal "Plugger," Pierce-Racine, K-R-I-T, Enger, Great Western, Cino, Ohio. Staver-Chicago, Stoddard-Dayton, Crawford, Glide, Moon, Kline, Matheson, and Inter-State. All these are in the contesting class. A Randolph truck has been entered as a non-contestant to carry baggage as well as a Reading "6" and the officials' cars include an E-M-F, pilot and press car; Selden, pilot; Columbia, pacemaker; American Roadster, starter's car; Thomas, press; Washington, press, and Brush, photographer's car.

The Elgin Races

CHICAGO MOTOR CLUB PREPARING FOR THE TWO-DAY ROAD RACING CARNIVAL TO BE HELD OVER ITS NEW COURSE ON AUGUST 26-27. LIST OF OFFICIALS AND MAP OF COURSE.

STARTING August 26, and continuing over the following day, national stock chassis races of the simon-pure variety, and conducted over a typical road course will be held on the Elgin, Ill., raceway, and the winners of the various events may well lay claim to the national road racing championships.

The plans of the Chicago Motor Club in conjunction with the Elgin Automobile Road Race Association are in full blossom which will come to fruition the latter part of this month.

Official sanction was only recently granted, but within a few hours after the announcement had been made entries and the promise of entries began to pour in.

Arthur Greiner, an amateur, has named a National for the Elgin National trophy race, and the National Automobile Company, of Chicago, has entered a National for the Illinois trophy. Two Coles have been named by telephone from Indianapolis, and a Ford car has been entered by the Chicago branch, while assurances are given by the Lozier, Benz, Renault, Marmon, E-M-F, Parry, Falcar, Black Crow, Oldsmobile, Herreshoff, Cino, Matheson, Velie, Marion, Alco, Corbin, Simplex, Jackson, Midland and Stover, that they will make nominiations. The Lozier, which has been out of road racing for a couple of years, has gone so far as to secure headquarters at Elgin, which is taken as a guaranty of the company's serious intentions.

Chairman Harry T. Clinton and his associates on the Contest Board of the Chicago Motor Club have selected the officials who will handle the National Stock Chassis Road Races as follows:

Honorary referee, C. H. Hulburd; referee, David Beecroft; judges, F. C. Donald, Everett C. Brown, T. J. Hyman, W. C. Thorne, W. F. Grower, A. J. Banta, F. W. Jencks, G. E. Hunter and Frank H. Trego; starter, Fred. J. Wagner; assistant starter, Oliver G. Temme; clerk of the course, Harry T. Clinton; assistants, W. J. Zucker and J. S. Woodworth; technical committee, A. E. Edwards, Berne Nadall, Otto Von Bachelle; timers, C. H. Warner, J. P. Frisby, R. T. Laughlin, H. W. Cooper; chief checker, John H. Kelly, assistants, L. Z. Sheldon, Ralph Hoagland, W. Nussbaum, Frank Sparks, Ed. Guston, O. L. Foote, Hosmer H. Allen, Lyle Miller and L. R. Campbell; chief scorer, Charles E. Gregory; chief flagman, Frank B. Wood; military aid, C. A. Tilt; chief announcer, L. B. Sanders; chief electrician, Al. Adams.

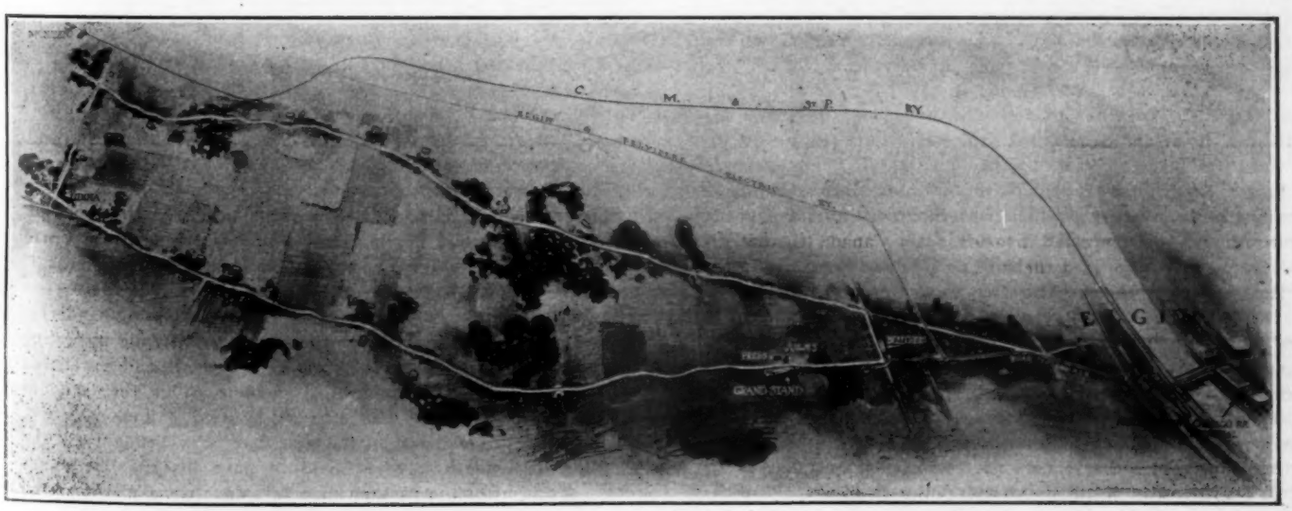
At the same meeting it was decided to postpone the club's annual hill climb at Algonquin, Ill., the new date selected being Thursday, September 15. This action was taken because it was found that it would be impossible to finish by September 10 the artificial hill which will be used for the standing start climb.

The club has had trouble getting Perry Hill for this, the grade being in another county. The Algonquinites, however, have promised to build a special hill 1,000 feet in length and which, it is said, will be one of the stiffest propositions a motor car ever has been called upon to tackle. Ten teams and twenty men started at the hill immediately; it will be done by September 1.

The motor club has received the design of the Elgin National trophy, which is to be the prize in the big race the second day, the event for cars under 600 cubic inches piston displacement. It is best described as a classic vase, 3 feet 8 inches high above the pedestal. It is a two-handled cup, the main decorations being the laurel oak and water leaves. This cup is designed to take six wreaths with inscriptions and two panels, one for the motor car scene on the obverse side, and on the reverse side the main description of the cup. On the neck of the cup is the figure of Father Time. The trophy is valued at $4,500.

The Chicago Motor Club and the Elgin Automobile Road Race Association have decided to sell the seats at popular prices. They have formed a combination with the property owners, so that everyone who sees the races will have to pay 50 cents. Then grand stand seats will be sold for $1 for each day; box seats will be sold at $1.50 each, while bleacher seats can be made for 50 cents. Parking spaces will be sold at $1 per car. The seating accommodations will be for 7,000 people, but more can be added if needed.

The course has been found to be 8 miles, 2499 feet in length.



Bird's-eye view of Chicago Motor Club's National Stock Chassis road race couse at Elgin, Ill.

Commercial Car Run

NEARLY FOUR-SCORE ENTRIES FOR THE MOST IMPORTANT AFFAIR OF THE KIND EVER HELD IN THIS COUNTRY. THE CONTEST WILL SURELY DEMONSTRATE UTLITY OF BUSINESS VEHICLES.

WITH a probability of seventy entries, representing many styles of commercial trucks and freight vehicles, the endurance contest under the auspices of the Philadelphia *North American*, which will be run August 12 and 13 from Philadelphia to Atlantic City and return, is attracting wide attention.

The idea of the contest is to demonstrate the ability of the truck to make a time schedule with economy of fuel or current, and the newspaper has offered prizes aggregating $1,000 for the winners. The running of the affair is in the hands of the Quaker City Motor Club. The roads selected for the trial are in excellent condition, but in order to show that the cars can surmount ordinary road difficulties, several trying stretches of highway have been included in the itinerary.

The distance to Atlantic City is about 62 miles and under the plan that has been worked out the gasoline cars will be divided into four classes. In class A, a schedule of fifteen miles an hour will be required. This class is the manufacturers' division for trucks of 1 1-2 tons capacity and less.

In Class B, with capacity of from 3,001 to 5,999 pounds, a running time of twelve miles will be asked. In Class C, from three to four tons, ten miles an hour must be made and in the same class, but for cars of over four tons capacity, the schedule calls for eight miles an hour.

In the electric division, Class A must make 12 miles an hour; Class B, ten miles and Class C, eight miles an hour. An accurate record will be kept of the gasoline and oil used by the gasoline cars and of the electric current used by cars of that variety and due allowance will be made in computing the result.

The cars are all required to carry their advertised loads and the figures on the proportionate consumption of power will give a basis of cost of transportation.

The list of entries to date includes the following:

MANUFACTURERS' DIVISION

Class A (1½ tons capacity and less)

Car	Entrant	Driver
Strenuous Randolph	Randolph M. C. Co.	R. G. Shuert
Chase	Commercial M. C. Co.	W. F. Wood
Chase	Commercial M. C. Co.	R. L. Ferris
Franklin	Franklin M. C. Co.	W. R. Coughty
Martin	Martin Carriage Works	E. L. Kraft
Martin	Martin Carriage Works	John M. Bowers
Torbenson	Torbenson M. C. Co.	Allen Torbenson
I. H. C. Wagon	International Har. Co.	W. A. Bauer
I. H. C. Wagon	International Har. Co.	Daniel B. Shock
Buick	Buick Motor Car Co.	Hubert Cato
Buick	Buick Motor Car Co.	William Thompson
Atterbury	Finnesey & Korber	M. Korber
Chase	Commercial M. C. Co.	W. J. Burns
Rapid	Rapid Motor Vehicle Co.	James Parrey
Hartkraft	Hartkraft Mot. Truck Co.	R. B. Lawrence

Class B (between 3001 and 5999 pounds capacity)

Car	Entrant	Driver
Garford	Garford M. Truck Wks.	Mr. Ritter
Grabowsky	Edgar W. Hawley	G. G. Stranahan

Class C (three tons and above)

Car	Entrant	Driver
Frayer-Miller	Kelley M. Truck Co.	Harry Weber
Schleicher	Schleicher M. V. Co.	Alfred Besser
Standard	Standard G. & El P. Co.	W. Hunsburger
Gramm	A. E. Gardiner	Archie Nobb
Gaggenau	Benz Import Co.	P. W. Gaylor
Packers	Packers M. T. Co.	C. H. Smith

PRIVATE OWNERS' DIVISION

Class A

Car	Entrant	Driver
Autocar	Strawbridge & Clothier	
Autocar	John Wanamaker	R. Crossing
Autocar	Bailey, Banks & Biddle	John J. Frewen
Autocar	Bailey, Banks & Biddle	Jos. P. F. Daly
Stoddard-Dayton	Bailey, Banks & Biddle	
Autocar	Lindsay Bros., Inc.	J. Horace Lindsay
Autocar	Consolidated Tire Co.	James Justice
Maxwell	Coca Cola Co.	A. A. Whitcomb
Chase	Freihoffer Baking Co.	
Autocar	Cluett-Peabody Co.	John A. O'Neil
Autocar	Cluett-Peabody Co.	J. M. Beatty
Autocar	E. Bradford Clark	Frank Donnelly
Autocar	Fritz & Larue	Frank J. Scullin
Rowan	Wright & Co.	A. W. Kneer
Autocar	Michael del Collo	M. del Collo
Autocar	Eshelman & Craig	Elmer Baurichter
Autocar	Gurnse Butter Co.	
Autocar	Gurnse Butter Co.	
Autocar	J. E. Coggswell	E. L. Keller
Autocar	A. F. Burnot Bros. Co.	J. G. Carvill
Renault	A. F. Burnot Bros. Co.	G. Meyers
Autocar	Theo F. Siefert	B. Siefert
Autocar	J. S. Ivins Sons	H. V. Fancey
Cartercar	Kellogg T. C. F. Co.	Kennetty

Class B

Car	Entrant	Driver
Reliance	J. B. Van Sciver Co.	
Motor Commercial	Suburban Auto Ex. Co.	M. Plush

Class C

Car	Entrant	Driver
Mack	Shane Bros. & Wilson	
Saurer	Baldwin Loco. Wks.	H. Brostrand
Saurer	Baldwin Loco. Wks.	Thos. Carberry
Saurer	Baldwin Loco. Wks.	W. C. Hampton
Packard	John Wanamaker	W. Hampton
Reliance	J. B. Van Sciver Co.	
Alco	Gimbel Bros.	
Alco	Gimbel Bros.	
Frayer-Miller	Fleck Bros	A. Jones

ELECTRIC VEHICLE DIVISION

Class A

Car	Entrant	Driver
Commercial	John Wanamaker	John Dillon
Commercial	Bergdoll Brewing Co.	Fred Baurer

Class B

Car	Entrant	Driver
General Vehicle	Bergdoll Brewing Co.	Harry Wright
Commercial	John Wanamaker	Thos. Kelly
Commercial	American Brewing Co.	F. Flubacher

Class C

Car	Entrant	Driver
Commercial	American Brewing Co.	Robt. Rother

Croxton-Keeton Motor Company Will Come Back

H. A. Croxton, president of the Croxton-Keeton Motor Company of Massillon, O., which was thrown into the hands of a receiver August 1 on Mr. Croxton's application to the Federal Court at Cleveland, was in New York Tuesday making arrangements looking to a reorganization.

According to Mr. Croxton the receivership will be lifted within sixty days and the 1911 line of cars will be ready for market by September 15. He stated that the troubles of the company were due to a disagreement between some of the officers and that he only resorted to a receivership in order to protect the creditors from ill-advised and hasty action.

He says that the assets of the company, pruned down to the last degree, amount to $295,000 and the liabilities are $273,000. Mr. Croxton says he is the owner of 90 per cent. of the stock of the company. P. L. McLain has been named as receiver.

Garage Owner Charged with Swindling

Edward Underhill, proprietor of the Garage de Luxe, 57 East 108th street, and Henry Roy, chauffeur, employed by Underhill, were held to Special Sessions last Friday by Magistrate Cortel of the Harlem Court on a charge of violating the short-measure ordinance. Bonds were fixed at $500.

Inspectors Mills and Morgan are the accusers of Underhill and his employee. They charge that on July 16, while inspecting garages, they stopped at the place of Underhill and purchased what purported to be ten gallons of gasoline. This, they say, did not measure up to the full amount by two gallons.

The officers declare that the shortage was brought to the attention of Underhill, who failed to have his gasoline pump repaired, and after the passage of a few days warrants of arrest were sworn out and bail fixed at $1,000 each, the Garage Owners' Association taking an active part in the prosecution.

Some 1911 Automobiles

(*Continued from page 219*)

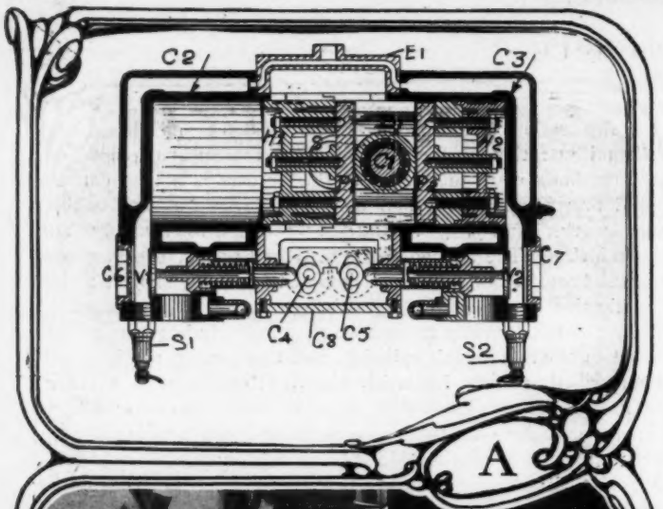
point. Models 31 and 32 differ from 1910 designs in that the bore of cylinders is increased from 4 7-8 to 5 inches, bringing the cylinder dimensions to 5 x 5 1-2 inches. In model 31 the wheelbase is 1 inch more than in the previous model, bringing it up to 123 inches. In the ignition system the Bosch high-tension magneto replaces the low-tension type previously used. This change simplifies the dashboard equipment materially, cutting out the induction coil formerly employed in the low-tension system. A means is provided in the new cars for the independent operation of the magneto, or auxiliary ignition. A Yale lock is incorporated into the switch, securing it in the neutral position when the car is shut down, and affording excellent protection to the owner of the car by preventing a purloiner from closing the electrical circuit of the ignition system. Lubrication is reduced to the most simple form, involving the splash method and a circulating means. There are two splash compartments in the four-cylinder motor, and the hand pump provided is so arranged that the supply of oil may be replenished in either of the compartments independent of the others. The plunger pump used for circulating is located at the bottom of the case and is driven by a gear taking power from the camshaft. In view of the increase in the size of the motor the dimensions of radiators were adjusted in conformity with the needs, and the extent of refinement at all points in these models is carried even to the length of locating the battery in a suitably contrived compartment inside of the chassis frame in a protected position beneath the floor boards of the tonneau. Dress guards cover the forward end of the rear springs, thus facilitating access and improving the appearance of the models. The front fenders are brought to a higher state of perfection and take the curvature of the front wheels, presenting an artistic appearance. The steering column is provided with an 18 1-2-inch hand steering wheel mounting the spark and throttle control of the same design as last year. The clutch of the internal expanding leather face band type is the same as formerly, and the connections from the foot pedals are with ball and socket jointed rods. Transmission gearsets are of the selective type and the mechanisms for manipulating and locking the gears are enclosed within the case.

In the Flanders "Twenty," made by the E-M-F Company, Detroit, the motor is of the "bloc" type with four cylinders, bore 3 5-8 inches and 3 3-4-inch stroke, with the valves located all on the left side, making the block casting of the L-type. The lubrication in this motor is what is known as the vacuum type, designed for a constant level with a gravity feed. Cooling is with water, using a gear-driven centrifugal pump, aided by a vertical tube radiator and a fan driven belt. Ignition is of the jump type with a Splitdorf magneto and auxiliary coil. The carbureter is of the float feed type with auxiliary air valve and gravity feed. The clutch is of the inverted cone type with a leather facing against cast iron, and the selective sliding gear, with two forward speeds, and reverse, is swung on the rear axle.

The Inter-State motor, made by the Inter-State Automobile Company, Muncie, Ind., is of the four-cylinder type, rated by the makers at 40 horsepower, with a 4 1-2 inch bore and 5-inch stroke. The cylinders are of the L design, cast in pairs, with all valves located on the right side. Lubrication is by constant level splash maintained by a gear pump which is shaft driven. Gravity feed is relied upon for the rest. The water-cooling system includes a circulating pump, honeycomb type of radiator and a belt-driven fan. Ignition is by jump spark with a double system, including a U & H magneto and dry cells in conjunction with a coil for the auxiliary system. A Stromberg carbureter with a gravity feed takes care of the full situation. A multiple disc clutch with cork inserts takes the power from the motor and delivers it at the will of the operator to a selective sliding gearset, located amidships, affording three forward speeds and reverse. From the transmission gear to the live rear axle a shaft is used.

In the Franklin product as made by the H. H. Franklin Manufacturing Company, Syracuse, N. Y., four models of open cars are offered for the new year, two of which are "sixes" and two are "fours." One of the Franklin bodies is given in the plate of body illustrations. It is of the full flush-sided type and is an excellent illustration of the Franklin line, remembering, however, that the body work on the four-cylinder cars is a long conventional touring line. The new models are with increased wheelbase lengths, namely, 133 inches, 122 3-4 inches, 107 1-2 inches and 99 5-8 inches. The air-cooled motor, based upon the general design as brought out in 1902, is retained for 1911, subject to the modifications indicated by a year's experience. The method of cooling is substantially as in 1910 motors, including a metal air jacket surrounding each cylinder, and the cooling air is drawn from grilled openings located in the front of the hood, a fan in the flywheel being used for the purpose. In the several models of cars the cylinder dimensions are as follows: 4 1-2 inches x 4 1-2 inches, 4 inches x 4 inches (for two models) and 3 3-8 inches x 4 inches for the remaining models. Fiber gears are used for the camshaft gears, also for the magneto idle gear. The one great change of the year lies in the location of the valves. It will be remembered that concentric valves were employed in the 1910 motors, whereas this year the intake valve and the regular exhaust valve are placed side by side in the cylinder head. The new valves, operating separately, are claimed to be more nearly noiseless. An auxiliary spring is placed at the bottom of the valve lifters to hold the walking beam in constant contact with the end of the valve stem for the purpose of reducing lost motion and aborting noise. The auxiliary exhaust valve at the base of each cylinder is retained. A new oiling device is adopted; the oil is fed by a force-feed oiler through the crankshaft and into the engine base. Oil is introduced into cups on the internal base bearings, whence it runs directly onto the shaft through a groove and thence through a hole drilled in the shaft which extends through to the connecting-rod end. By centrifugal force the oil is passed to the connecting-rod bearings through oilways in the crankshaft. The cylinder walls are lubricated by a spray of oil as it is thrown off of the connecting-rods. Splash is depended upon to some extent to add to the profusion of oiling.

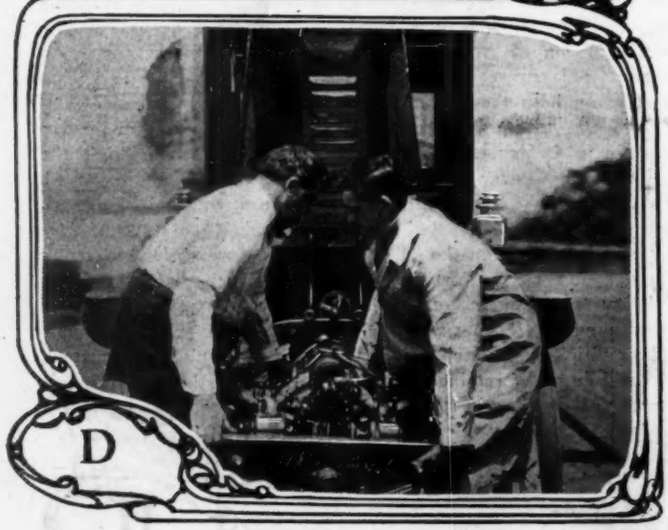
The Chalmers power plants, made by the Chalmers Motor Company, Detroit, remain substantially as in the 1910 models, excepting, of course, that the necessary shop process modifications have been made and are rapidly being brought to a high state of perfection, with the idea of inducing a greater measure of stability and adding to the uniformity of production. The finer methods of heat-treatment that come with the introduction of the latest and most approved pyrometers and facilities are available in the new addition to the plant, and matters such as this, while they do not make a change in the construction features of the output such as can be noted down in a dimensional way, do, nevertheless, constitute a material advance. The company states that mechanically the 1911 models are merely refined; a number of little changes constitute this refinement, rather than any radical departure. The "Thirty" motor is now being built in the plant of the company, and the material advance in its construction is by reducing vibration and improving the general appearance as well as the workmanship of the motor. In the "Forty" motor the valve springs are encased and noise is thereby muffled. The wiring system on both the "Thirty" and "Forty" models is much simplified and rendered more stable, otherwise the ignition devices remain as before on the "Thirty" horsepower model, but the "Forty" horsepower ignition system has been materially improved, the Bosch dual system of ignition with a unit coil and four spark plugs having been adopted. The improved Mayer type of carbureter is regular on the "Thirty," but the Stromberg carbureter is adopted for the "Forty." The constant level splash system of lubrication obtains in both models. On the "Forty," however, the gear pump has been supplanted by a plunger type of oil pump. The multiple disc clutch, using steel and bronze plates alternately, running in oil, is retained for the "Thirty," and the cone clutch is continued on the "Forty." There is no material change in the steering gear for 1911 over 1910.



A

B

C



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Twombly Automobile

EXHIBITING to the representatives of the metropolitan press in New York City on August 8, the Twombly Motors Company, 220 E. 41st street, New York City, presented a new motor car with so many advanced ideas in it that it amounts to a revolution of the conventions. Whether or not the ideas incorporated into this car will consummate a revolution depends upon the judgment of the autoing public. The foundation of the new design is based upon the question of accessibility of the power plant as a paramount issue, and the convertibility of the body as an important consideration. From year to year many autoists have persistently maintained that a single type of body should be available, not only for fine weather in the Summer time, but with protective measures at hand should the weather become inclement. This school of autoists also maintained that in Winter autoing, protection of the first order should be afforded without having to buy a new automobile to get it. They also contend that when the Sun shines in the Winter time, and the invigorating atmosphere augurs for health, there should be some way of opening up the limousine and enjoying the invigorating conditions. The Twombly limousine offers all these attractions, and the designer has mastered almost insurmountable difficulties in the attainment of the objects. All that remains in this regard is for the company to place its product at the disposal of users and find out if they were in earnest.

Despite the attractions offered by the type of limousine illustrated herein, the greatest change seems to be in connection with the power plant, in which the motor may be removed together with its accessories, inspected, if the occasion requires, and put back again within a few moments, it being light enough so that two men can handle it with ease. If it becomes necessary to remove the transmission gear also, it will come right out without having to unloosen a bolt or take down a bar. In re-assembling nothing remains but to replace the transmission gear first, and thereafter slide in the motor. The units re-unite with each other in satisfactory alignment and the transmission members take up their accustomed relations without the pursuasion of tools. When they are pushed back into place the locking studs are screwed up tight without having to make a water connection or in any other way tamper with the mechanism; the power plant will go about its business. The details of the power plant and the car as a whole are worked out to a fitting conclusion, and in short the designer of this automobile busied himself assiduously to satisfy a demand which seems to be pressing and forceful.

Among the mechanical features the cooling system is "thermal" and the bonnet is Renault fashion. Ignition is by Bosch Dual Magneto System, and the carbureter is of the float feed type. W. Irving Twombly, the designer of this type of car, having in mind the exigencies of taxicab service and town car work, has introduced another innovation in the form of enclosed helical springs in conjunction with dashpots for the suspension of the body, instead of the customary flat plate forms of springs typified in other makes of cars. The motor is in length equal to the distance of the cross members of the chassis frame, is 8 inches through in the vertical plane, and the cylinders are 5 x 5 inches bore and stroke respectively, of which there are four, working 4-cycle water-cooled. The motor weighs 266 pounds, including a flywheel, and is rated at 40 horsepower. There are many other nice details of design which were necessary to complete the plan, some of which are clearly depicted in the illustrations here afforded.

DEPICTING AN ENTIRELY NEW IDEA IN AUTOMOBILE DESIGNING WITH A CONVERTIBLE BODY AND A POWER PLANT THAT CAN BE REMOVED AND REPLACED IN THREE MINUTES.

(A) Depicts the motor of the Twombly Car, the same being in cross section showing the opposed cylinders in blackened section of which there are two sets parallel to each other in the horizontal plane. The crankpin C1 has an annular type ball bearing B for each connecting rod and pressure is transmitted from the crankpin C1 to the pressure faces P1 and P2 of the built-up pistons with heads H1 and H2. The built-up piston reciprocates between the pairs of cylinders C2 and C3 in juxtaposition so that to all intents and purposes a single piston serves for two cylinders, and undue pressure from angularity is entirely eliminated in this type of motor. When the crankshaft S rotates, the crankpin C1 describes an arc the radius of which is equal to the stroke of the piston in one direction. The ball bearing B takes the torquing moment, transmits it to the faces of the built-up piston, and since the ball bearing describes an arc equal to that of the connecting rod C1 in addition to reciprocating laterally in the guides, reciprocating motion is transmitted to the built-up piston and it performs precisely as in any other 4-cycle motor. The inlet and exhaust valves are placed one above the other, one valve V1 being shown for the left hand cylinder, and a similar valve V2 is shown for the right hand cylinder. The valves are actuated by cams on the cam shafts C4 and C5; the motion imparted is precisely the same as in a conventional 4-cycle motor. The valves are accessible through the covers C6 and C7 with similar covers in the same vertical plane for the purpose of getting at the valves not here shown. The entire motor is housed in, there being a cover C8 over the valve chamber, and an extension piece E1 between the two pairs of cylinders all around the circumference excepting where the valve housing breaks in. The motor sets horizontally between the two members of the chassis frame, with the cylinders athwartships. The spark plugs are shown S1 and S2 adjacent to the inlet valves, coming to the top of the motor, and the magneto is mounted on the top of the motor in an accessible position with the carbureter just to the back of it.

(B) With the footboards removed, the transmission gear G1 comes into view, it being back of the radiator R1, and the air propeller A1 is also presented. The control system is located amidship with the quadrant Q1 coming up through the floor boards, and the steering gear post P1 is located on the left hand side so that for an enclosed type of body the control system is located conveniently within, and for an open type of body entrance may be had from either side. The ignition system being of the Bosch dual type, the step-up transformer P1 is on the dashboard within the body, coming above the line of the footboards.

(C) This is a view looking at the front of the car with the motor M1 removed and placed on the floor at the left hand side, and the transmission gear G1 also removed and placed on the floor at the right hand side. Referring to the transmission gear, the cone clutch C1 shows plainly with a leather faced cone L1 and a Timken roller bearing R1 which is used for centering and for taking the load as well. Referring to the motor M1, the cross member C2 becomes the front member of the chassis frame and when the motor is slipped back into position in its guides within the side members, the studs S1 and S2 are used for fastening the motor into place, they being the only means for holding the motor in its position, excepting that the cross arms of the motor fit snugly in the guides provided in the chassis frame. The magneto M2 shows on the top of the motor, and the carbureter C2 is in line with the magneto, but to the back of it. At a demonstration which was made at the A. C. A. on August 8 for the benefit of the press, the motor and transmission gear were removed from the chassis and replaced again in 3 minutes and 3 seconds. The motor was running just before the change was made, and it was started again just after it was put back into place. Two men did the work, using nothing but a socket wrench by way of tools. Water and other connections are made automatically and it is the main plan of the company to place at the disposal of users a power plant that can be removed and replaced within a few moments should the occasion require. That is has succeeded in doing so has been proven in the test above referred to.

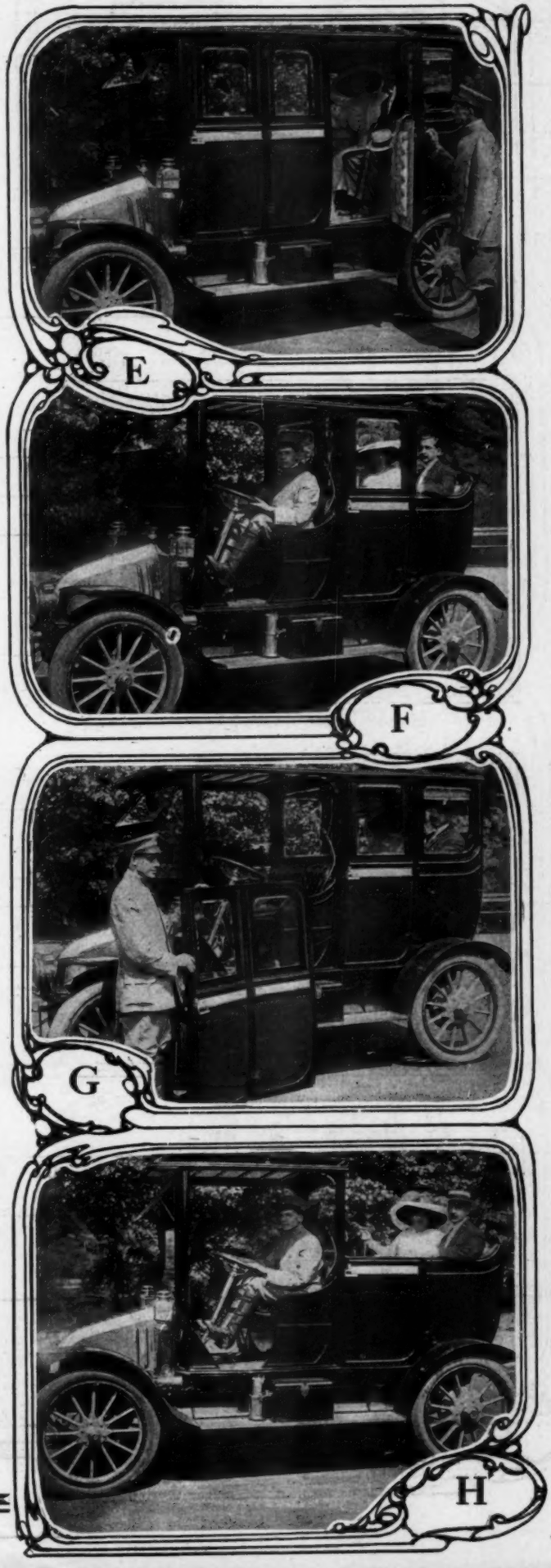
(D) This illustration of the quick removable power plant was taken while the men were in the act of putting the same back into place. When the plant is slid home, the Timken roller bearing R1 (C) self-centers, and a self-centering means is also provided between the transmission gear and the propeller shaft; at this point a suitable jaw drive is utilized, whereas between the power plant and the transmission gear, the clutch C1 serves as the transmitting member.

(E) The limousine type of body as here shown is complete with the front door, making the same entirely enclosed for inclement weather.

(F) This is a view of the same body with the front door taken away, and the back opened up sufficiently to admit air but protect the occupants from wind and dust.

(G) This view shows the side enclosures for the front ready to go into place. By means of dowel pins the panels are self-centering, and through the good office of an eccentric lock, the panels lock tightly and rattling or squeaking is obviated.

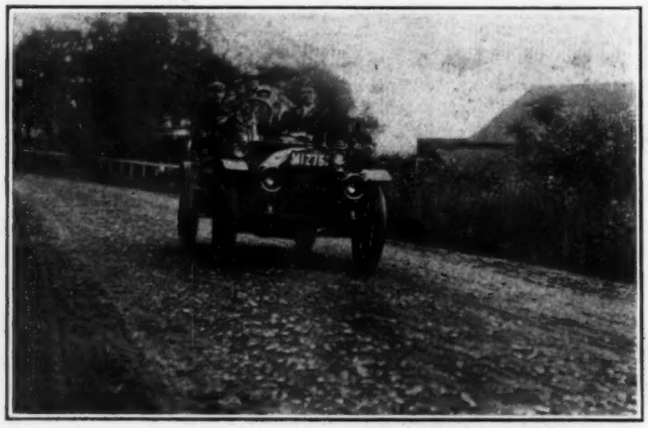
(H) This is a view of the body with the front panels removed, the side and back panels removed also, and the top or deck folded up and over so that it rests on the deck of the front end above the front seats. The most remarkable point, perhaps, in relation to this type of body, is one that cannot be appreciated without examining the same. The joints are all worked out so that there are no inartistic crevices or unsymmetrical surfaces due to the taking away of the panels, or the folding up of the deck. It is also worthy of note that the body is substantially made, goes together without any trouble at all, and runs without squeaking or making noises of any kind.



Contestants getting instructions before the start

Inter-State, No. 6, driven by H. G. Martin

The Hudson, No. 4, with W. H. Bruns at the wheel



The Cartercar performed well in the touring division

Brooklyn Dealers' Run

WITH a field of thirty cars in the contesting division, eight among the tourists and with a considerable escort of non-participating automobiles, the two-day Reliability run of the Brooklyn Motor Vehicle Dealers' Association was started early Tuesday morning from in front of the quarters of the Long Island Automobile Club. The sky was overcast and the weather bureau held out promise of a wet trip. But up to the moment of starting, the roads were in fine condition as the result of the showers of the night before.

The course of the run is about 400 miles and it zig-zags across the island, so as to cover most of the picturesque roads. From the start it leads to the north shore at Little Neck and thence through a dozen small towns to Smithtown, where a checking station was arranged. Crossing the island, the tourists made Patchogue and proceeded along the south shore to Bridgehampton, another control. The Eastern point of the tour was Amagansett where the course cuts northward again to the Sound and thence to Southhampton. The second day's run was along the North shore with frequent detours to make up the distance.

The first day's run consisting of 177 miles was accomplished without special incident or accident. The first dozen miles from the start were laid out over poor roads which were succeeded by better going this side of Flushing. Passing through that place the going was bad, but outside the town, smooth highways were encountered almost to Great Neck. A particularly bad stretch at the outskirts of the town, tested the cars and passengers severely and at intervals, trying spots were traversed all the way to Smithtown. The hill roads proved to be in excellent shape and after taking on fuel at Smithtown, the tourists proceeded to Patchogue, the noon control, over typical Long Island highways.

The back track to Smithtown was over another set of good roads and save for some stiff grades near Speonk, the whole afternoon route was easy. All the cars reached Southhampton, the night control, between five and seven o'clock.

Several clean scores were claimed as a result of the first day's run, but nothing official was given out to verify the claims.

One whole section of the run went astray after leaving Bridgehampton owing to lack of confetti, but this will not be charged against the contestants. The start of the final day's run was made from Southhampton at 8 o'clock in the morning.

At the conclusion of the run, clean road scores were claimed by the following cars: 23, Midland; 11, Winton; 14, Hupmobile; 3, Locomobile; 30, Pullman; 5, Ford; 9, Ford; 7, Stevens-Duryea, and 22, Chalmers. Besides these the official report may include similar claims for several of the other contestants.

Tire troubles were experienced by several of the cars, but not sufficient of this variety of trouble was had to affect the final score of any of the entrants. The Halladay, No. 10, broke a valve on the first day's run; Speedwell, No. 19, was ditched during the second day, but was able to continue. Otherwise the run was singularly free from accidents.

Secret controls had been established at five points and the cars were checked at these places as well as the regular checking stations to determine the consistency of their running time. This feature of the affair resulted in some delay in announcing the scores of the various entrants, and it will probably require at least 24 hours to reach exact figures on all the cars.

The weather at the finish was stormy and all the tourists were well soaked when they arrived at the clubhouse of the L. I. A. C. The rain of the final day started about noon and from that time to the end there was a gray drizzle that proved uncomfortable to all hands.

Eight beautiful trophies were offered for the winners in the various classes.

MORE THAN TWO-SCORE CARS PARTICIPATED IN THE TWO-DAYS' RELIABILITY CONTEST UP AND DOWN THE LENGTH OF LONG ISLAND

The officials of the affair were: A. R. Pardington, vice-president of the Motor Parkway, referee; E. L. Ferguson, starter and E. F. Korbel, secretary.

The full list of the entrants is as follows:

Class 1A, selling at $800 and less—

No.	Car	Entrant	Driver
14	Hupmobile	D. M. Bellman	A. H. Bellman
15	K-R-I-T	Schaap Auto S. Co.	A. K. Schaap, Jr.

Class 2A, selling from $801 to $1200—

4	Hudson	Bruns Auto Co.	W. H. Bruns
5	Ford	B. McC. and Bishop	Walter Blake
9	Ford	F. W. Matthews	F. W. Matthews
25	Maxwell	I. C. Kirkham	G. M. Wagner

Class 3A, selling from $1200 to $1600—

8	Maxwell	I. C. Kirkham	E. T. Bloxham
17	E-M-F	Carpenter Mot. Veh. Co.	F. A. Ainslee
20	Maxwell	W. H. Fessel	W. H. Fessel
26	Crawford	Prospect Pk. So. Garage	W. H. Houdcroft
28	Overland	C. T. Silver	George Weber

Class 4A, selling from $1601 to $2000—

2	Haynes	J. D. Rourk	L. A. Rourk
6	Inter-State	H. G. Martin	H. G. Martin
12	Auburn	Enterprise Gar. Co.	Jacob Stark
13	Velie	Cumberland Garage	A. Wilmorth
22	Chalmers	Bruns Auto Co.	Emil Feidler
23	Midland	J. M. Boyle	Leo Anderson
24	Haynes	Haynes A. C. of N. Y.	R. Schmidt
27	Herreshoff	A. W. Blanchard	A. W. Blanchard
29	Pullman	Cimmotti Bros.	Ellis Kulp
30	Pullman	Cimmotti Bros.	John Hoffman

Class 5A, selling from $2001 to $3000—

1	Columbia	I. C. Kirkham	I. C. Kirkham
10	Halladay	Grant Sq. A. Co.	Jos. Kenny
11	Winton	Carlson A. Co.	William Braden
16	S. G. V.	Mears Auto Co.	J. M. Mears
18	Kline	Bryant Mot. Co.	C. Smith
19	Speedwell	G. W. Garland, Jr.	A. Gross
21	Columbia	I. C. Kirkham	J. N. Wagner

Class 6A, selling for $3001 to $4000—

3	Locomobile	W. H. Kowenhoven	P. Mahony
7	Stevens-Duryea	I. M. Allen Co.	A. J. McDermott

In the division devoted to touring the following cars were entered: Ford, White, Cadillac, Paterson, Stearns, Carterca-, Winton, Stevens-Duryea and a Pullman.

The officials were carried in a Haynes, Franklin, Locomobile and an Acme.

Mathesons in Next 24-Hour Race

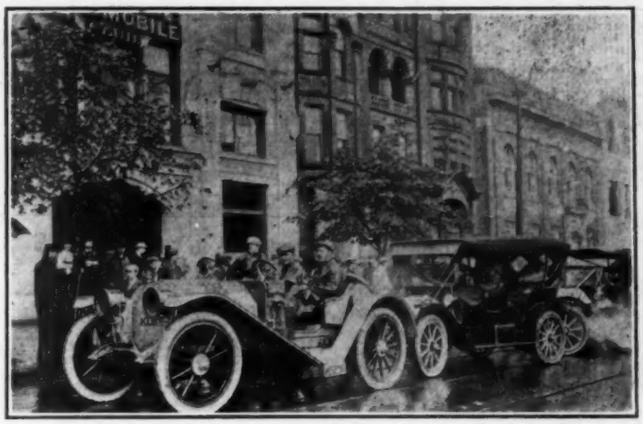
Matheson cars will seen in competition in the next 24-hour race to be held on the Brighton Beach race track under the auspices of the Motor Racing Association of New York, September 16 and 17. In all probability two cars will be entered.

Carriage Builders to Hold Meeting

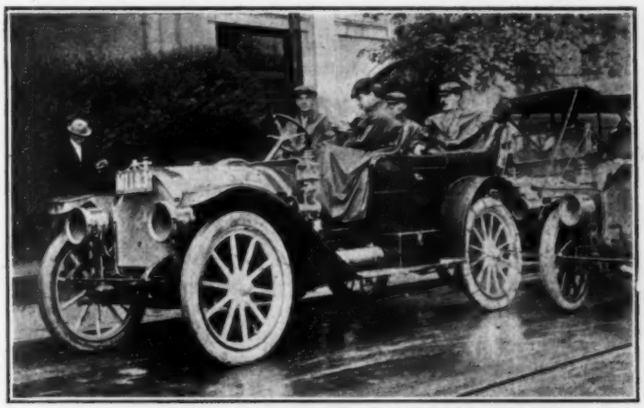
The thirty-eighth annual meeting of the Carriage Builders' National Association will be held in Cincinnati, Ohio, the week of September 25. In connection with the regular yearly exhibition of carriage parts, wagons and automobiles, there will be a series of business meetings of the association at the Ohio National Guard Armory on Freeman avenue. An elaborate program of entertainment has been prepared.

Van Sicklen to Head F-A-L Company

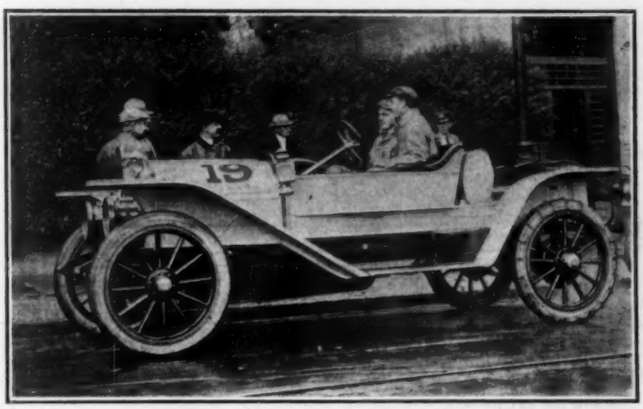
N. H. Van Sicklen, Sr., one of the best known men in the automobile industry, has been chosen president of the F-A-L Motor Company. Mr. Van Sicklen's long experience in motordom and his prominent position in the trade is accepted as a particularly promising evidence of his success as the head of a manufacturing company. His association with the F-A-L Motor Company completes a manufacturing organization of strength and experience.



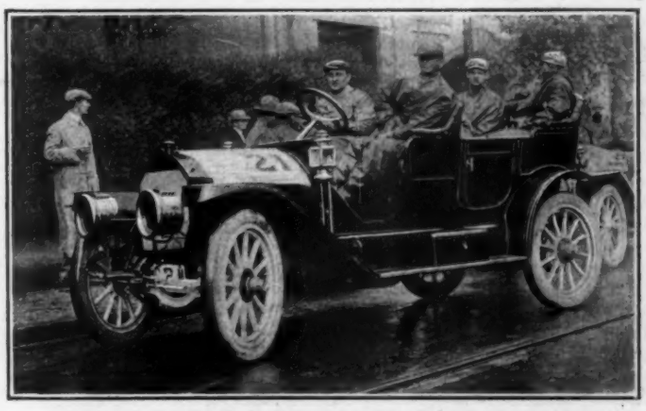
The cars started and finished at the Long Island Club House



Auburn, No. 12, Jacob Stark, driver, gets the word



Speedwell, No. 19, A. Gross in the driver's seat



J. N. Wagner's Columbia, No. 21, a Class 6A entry

Galveston Beach Races

THREE DAYS OF EXCELLENT SPORT FURNISHED TO THOUSANDS OF SPECTATORS. STODDARD-DAYTON AND CHADWICK FEATURED.

GALVESTON, TEX., Aug. 8—Without a hitch, the second annual meeting on the Beach Speedway was run last week in the presence of large crowds of enthusiasts. The feature of the first and second days was the work of Capt. J. W. Munn, president of the Texas State Automobile Association, who drove and won three races in his National 40. The Chadwick captured the 50-mile free-for-all in 42:56 4-5, and established a mile record for the course of 40 3-5 seconds.

The final day of the meet saw a new record hung up for the Beach course in the 200-mile free-for-all, which was won by a Stoddard-Dayton. The summaries:

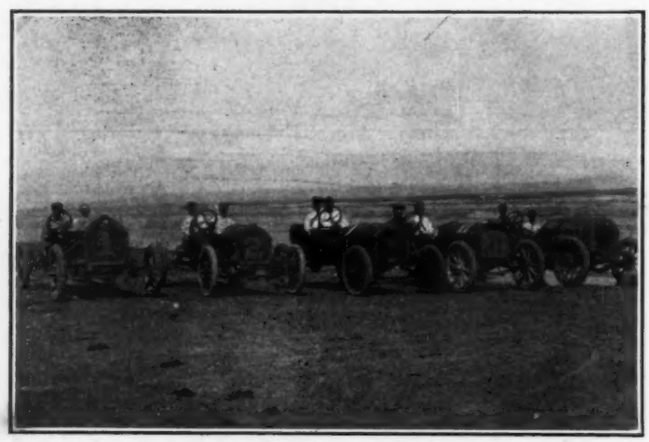
AUGUST 3

Twenty miles; Class B, Division 2B—

Car	Entrant	Driver	Time
Stoddard-Dayton	Alamo Auto. Co	De Hymel	Did not fin.
Buick	Geo. DeWitt	Dewitt	22:41
Buick	L. E. Perry	Petit	21:42

Thirty miles; Class B, Division 4B—

National	J. W. Munn	Munn	27:57 3-5
National	H. F. Sundin	Sundin	29:58 4-5
Inter-State	M. O. Kopperle	Brinker	32:10
Moon	Guy Nunelly	Wells	....



Line-up in one of the big races on the beach—two Stoddard-Daytons, Hudson, Moon and Chadwick

Twenty miles; Class B, Division 3B—

Marion	P. R. Plummer	Plummer	21:52
Marion	F. L. Carroll	Carroll	23:32

Fifty miles; Free-for-all—

Chadwick	Chadwick Eng. Wks.	B. Johnson	42:56 4-5
Buick	Geo. DeWitt	DeWitt	43:23 1-5
Interstate	M. O. Kopperle	Brinker	....
Marion	P. R. Plummer	Plummer	....
Stoddard-Dayton	Alamo Auto. Co.	De Hymel	....
National	J. W. Munn	Munn	....

AUGUST 4.

Twenty miles; 451 to 600 cubic inches—

National	J. W. Munn	Munn	17:23
National	H. F. Sundin	Sundin	18:17 2-5
Stoddard-Dayton	Alamo Auto. Co.	De Hymel	No time kept
Interstate	M. O. Kopperl	Harold S. Brinker	No time kept

Ten miles; 161 to 230 cubic inches—

Stoddard-Dayton	Alamo Auto. Co.	De Hymel	11:52 4-5
Buick	L. E. Perry	Henry Petit	12:01 4-5
Buick	George DeWitt	George DeWitt	12:18 4-5

One mile, Galveston Beach record, flying start—

Chadwick	A. S. Johns	Len Zengel	40 3-5 sec.
Stoddard-Dayton	Alamo Auto. Co.	De Hymel	41 4-5 "
Chadwick	Chadwick E. Wks.	Ben Johnson	42 3-5 "
Buick	George DeWitt	DeWitt	44 1-5 "
National	J. W. Munn	Munn	45 1-5 "

Ten miles; 231 to 300 cubic inches—

Marion	F. Lee Carroll	Carroll	11:10
Stoddard-Dayton	Alamo Auto. Co.	De Hymel	11:35 1-5
Marion	P. R. Plummer	Plummer	12:06 3-5
Moon No. 11	Guy Nunnelly	Phil Wells	No time kept

Ten miles; 301 to 450 cubic inches—

Car	Entrant	Driver	Time
National	J. W. Munn	Munn	8:51 3-5
National	H. F. Sundin	Sundin	9:06 4-5
Moon	Guy Nunnelly	Phil Wells	No time kept

AUGUST 5

Free-for-all, 200 miles—

Stoddard-Dayton	Alamo Auto. Co.	Tobin de Hymel	3:02:22
Chadwick 6-cyl.	Chadwick E. Wks.	Ben Johnson	3:20:21 2-5
National	J. W. Munn	Munn	3:33:33 2-5
Chadwick 6-cyl.	A. S. Johns	Len Zengel	Did not fin.
Buick	George DeWitt	DeWitt	Did not fin.
Hudson	E. H. Labadie	Labadie	Fin. 4th
Marion	F. L. Carroll	Carroll	Did not fin.
Marion	P. R. Plummer	Plummer	Did not fin.
Interstate	M. O. Kopperl	Harold S. Brinker	Did not fin.
National	H. F. Sundin	Sundin	Did not fin.
Marmon	J. P. McNay	Clark	Did not fin.
Stoddard-Dayton	Alamo Auto. Co.	Will Steinhardt	Did not fin.

M. R. A. to Stage Another Matinee

Several novel features will be introduced at the matinée to be given by the Motor Racing Association at Brighton Beach Saturday. One of the events carded for that occasion is a pursuit race in which the four contestants are to start from the quarter poles, the race to be divided when one of the entrants laps each of his competitors. An attractive program of sprints has been arranged.

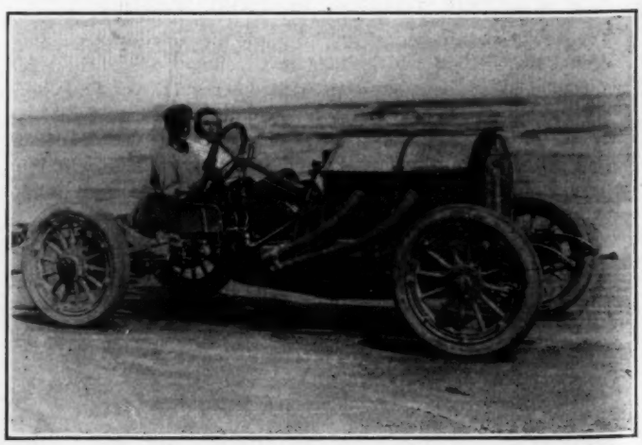
As only four cars can start in such a contest as the pursuit race, the association has announced that it will reserve the right to classify the entrants so as to produce a real contest. In case the entries are of sufficient volume to warrant it, there may be two or even more races of this type.

Among the entries so far received are those of a Marion, Cole, S. P. O., Correja, Fiat, Palmer-Singer, Houpt-Rockwell and the probability of still another big car.

One mile time trials against the record of the course, 52 3-5 seconds, will be another feature and considerable promise is held out that the mark will be set lower. It will be recalled that in longer races recently over this course miles have been made over a second faster than the standing record.

In the Class C races, two ten-mile dashes will be run, one for cars of 161-300 cubic inches displacement and the other for 301-600 cubic inches. The amateurs also will have a chance to show their paces. The program will be rounded out with a free-for-all and a one-hour race, similar to the one given recently.

In some respects the program offered for Saturday afternoon is one of the most pretentious of the present season.



Stoddard-Dayton "50" which won the 200-mile race on the Galveston beach in 3 hours, 2 minutes, 22 seconds

Week's Doings in Detroit

NEWS OF TRADE HAPPENINGS DURING THE PAST SEVEN DAYS IN THE GREAT AUTOMOBILE MANUFACTURING CENTER OF THE COUNTRY

DETROIT, Aug. 8—Agents handling the Everitt "30" met here last week in conference with officers of the Metzger Motor Car Company, and spent several days looking over the 1911 line. At the conclusion of the convention it was announced that the distributors in attendance had contracted for 4,000 cars, the entire output of the factory for 1911.

W. S. Piggins is the new president of the K-R-I-T Motor Car Company, assuming the place made vacant by the retirement of Claude S. Briggs. Kenneth Crittenden takes the vice-presidency and B. C. Kaughlin will serve as secretary-treasurer, with J. E. Winney as manager of sales.

Architect Louis Kamper has prepared plans for a factory building for the newly organized Universal Motor Truck Company. The company has purchased a site of three acres in the northeastern section of the city. The building will be of reinforced concrete construction, 254 feet long and 61 feet wide, with a separate power plant. Work will be rushed in the hope of having the factory ready for occupancy November 1. About 500 men will be employed at the start and the company hopes to have its first cars on the market early in February.

It will manufacture commercial trucks of one and one-half and three tons capacity, to be known as the Universal trucks. It is the intention, after the business has become well established, to make a five-ton truck, in addition to the smaller ones. This will make an addition to the plant necessary, but provision has been made for it in the plans. The men principally interested in the new venture are prominent Detroiters for the most part, including C. H. Habercorn, Judge More Rohnert, Louis Kamper, Curt Kling, Edward Barker, Albert Fisher and others. E. Uiklein, of Milwaukee, is another of the incorporators.

Another manufacturing concern is likely to make its début in the near future. As a preliminary step, the Aetna Investment Company was organized last Spring to manufacture a trial car of a new torpedo type. This company has recently increased its capitalization from $5,000 to $20,000. A second corporation, known as the Huron Radiator Company, has been organized by the same people and now has a factory in operation. The officers of the Aetna Investment Company are: President, Malcolm T. Faulkner; vice-president, Dr. L. C. Moore; secretary-treasurer, M. W. Allen. The directors are the officers and John A. Stuart and F. Stephen Kratzett.

The Detroit Auto Specialty Company is building a two-story addition to its plant on Greenwood avenue and has purchased 300 feet of land adjoining its property with a view to further increasing its facilities later on. The company makes gas engines, guards, fenders, tanks and other accessories.

The Goodfellow Tire Company, of Detroit, has increased its capital stock from $30,000 to $250,000.

The Lion Motor Sales Company has opened headquarters at 652 Woodward avenue, from which point it will handle the output of Lion cars, made at Adrian, Mich.

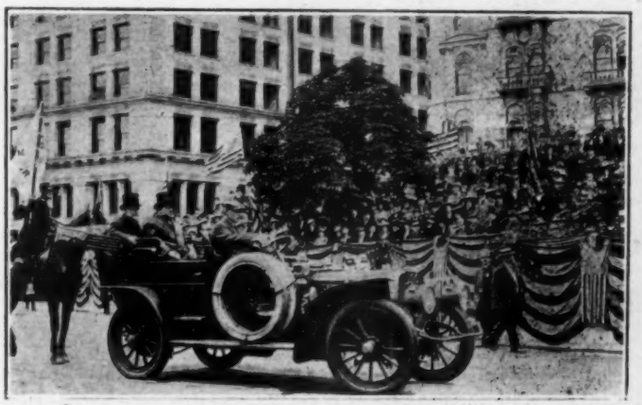
Charles F. Garaghty has been appointed assistant to the treasurer of the E-M-F Company, and will also take charge of the repair parts and claims department.

H. A. Mitchell, formerly assistant advertising manager for the Abbott Motor Company, has taken up engineering work with the Hudson Motor Company.

Harold S. Brinker, in his Inter-State "40," which performed well in the Galveston Beach races

William J. Gaynor, Mayor of New York, Shot

William J. Gaynor, New York's unique mayor, was shot and probably fatally wounded early Tuesday morning by J. J. Gallagher, a discharged employee of the Dock Department. The shooting occurred on the deck of the steamer *Kaiser Wilhelm der Grosse,* upon which Mayor Gaynor had engaged passage to Europe, just prior to the moment of sailing.



Mayor Gaynor, in a Lozier, welcoming the Atlanta-New York Good Roads tourists

Mayor Gaynor, during the few months in which he has been the presiding officer of the metropolis, has taken an important position with regard to good roads and the automobile. He has been alternately in great favor and much blame in the minds of motordom on account of his official activities.

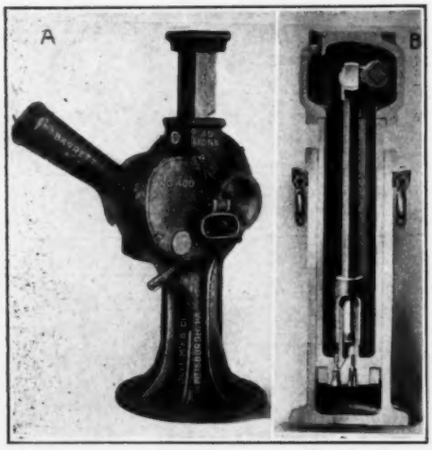
When the legislative matter touching upon the closing of the main automobile course from New York to Coney Island was presented to Mayor Gaynor, he gave the motorists short shrift and a shorter answer; but when the *Herald-Atlanta Journal* good roads tourists reached New York, the Mayor seemed particularly pleased to deliver the address of welcome.

He has been named as an honorary official of numerous contests about New York, but so far as is known he has never served in such capacity. His peculiar personality has made a deep impression upon the people of the whole country, because of his directness and lack of softening diplomacy. The bullet which struck him down took effect below his right ear. The assassin was captured on the spot by "Big" Bill Edwards, Commissioner of Street Cleaning, who was also wounded in the struggle that resulted.

Prominent Automobile Accessories

POWERFUL JACKS FOR AUTOMOBILES

Among the necessaries in the equipment of an automobile tool box is a jack capable of handling the weight of the car without much effort. The Duff Manufacturing Company, of Pittsburg, Pa., is making a specialty of jacks of all sizes, ranging from those suitable for automobile work to large ones with a capacity of 40 tons. The Barrett Ratchet Geared and a sectional view of the Duff-Bethlehem hydraulic jack are here shown. The latter, with its bottom forged integrally, obviates the troublesome problem of packing. A minimum number of parts are employed in the operating mechanism, and any part may be easily replaced without special tools. One man can easily operate this jack to its normal capacity, and no operating valves projecting beyond the body of the jack, there is less likelihood of breaking from rough usage.



Handy jacks for automobile tool boxes

A MODEL QUICK-DEMOUNTABLE RIM

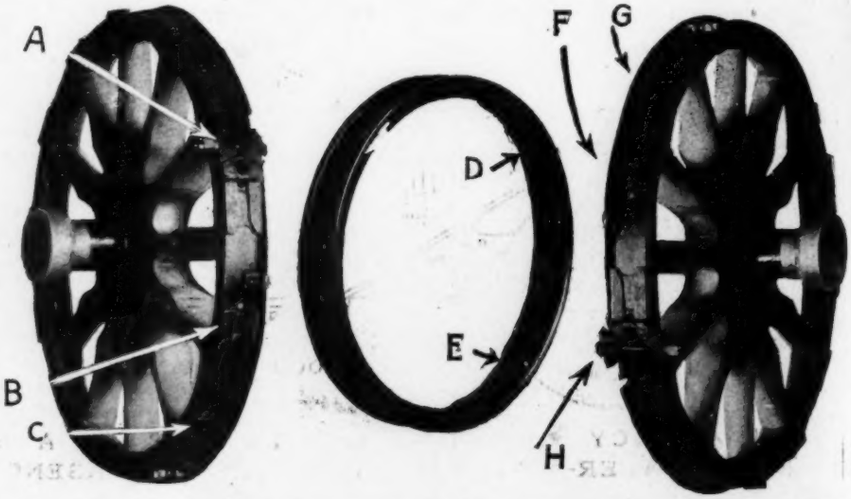
The demountable rim has so proved its convenience and adaptability that it is rapidly approaching the point where it will be included in the regular equipment of all high-class cars.

As quickness of adjustment in the *raison d'être* for the demountable rim, so experts are laboring to still further lessen the time necessary for tire replacements on the road. As a milestone in the progress along these lines the Denegre demountable rim, made by the company of the same name at 1922-24 Avenue F, Birmingham, Ala., is here shown. The illustration shows a steel rim shrunk around the wooden felly of an artillery wheel.

On the inside surface of the tire rim are placed fasteners at equal distances apart. Thirteen are used. These fasteners are 2 inches wide by 2½ inches long and are provided with tongues or ribs ⅝ inch wide. The fasteners taper from the center toward either end and are thus capable of being placed right or left. At the point where the valve extends through the tire rim it is provided with small steel blocks which are cold riveted to the rim. These blocks act as a shoulder by which the rim is pried off. The fasteners are also cold riveted to the rim.

On the steel wheel rim at equal distances apart are a corresponding number of fasteners, which are also cold riveted to the rim. They are provided with grooves ⅝ inch wide, which allow the tongues or ribs of the tire rim fasteners to enter. It will thus be seen that the tongue-and-groove principle is used. These fasteners on the felly rim are the same width and length as those on the tire rim. They are tapered differently, however. The taper extends from one end to the other, or the total length of 2½ inches.

The hole for the valve in the wheel rim and felly is the regulation size, except that it is elongated so as to permit the rotative action when the tire rim is being mounted and fastened. The fasteners are so arranged that the tendency is to tighten by reason of the taper. After the tire rim with the inflated tire has been mounted on the wheel and set into place as much as can be by hand, the key is put in and the final drawing into place is done with the bolt. As but one bolt and nut is necessary, it is an easy matter to have a castle nut with a cotter pin, thus preventing the nut from working off. The felly of the wheel is not cut and weakened by bolts, nor is the tire rim cut through. It is a solid, continuous steel rim. The whole outfit is simple, absolutely safe and reasonably light.



Details of Denegre demountable rim—A, retaining key in closed position; H, the same in open position; B and F, the fasteners; C and G, grooves which take tongues on the tire rim; D, steel fastener, cold riveted to rim; E, showing taper from either end—can be placed right or left

REFINEMENT IN AUTO HORNS

With a view of improving the tone of automobile horns, and especially to avoid the clogging and "muting" common to all horns using the ordinary reed, when the bulb is pressed suddenly or too forcibly, the Gaylor Automatic Stopper Company, of Stamford, Conn., has devised a double-acting reed, which insures a loud blast of the horn under any or all conditions. The tongue, or vibrator, is set exactly central in the reed; this prevents clogging, for one valve is always open and will start the vibration. Besides, the tone produced is smoother and longer with the double-acting, centered reed than with the usual form.

WIND SHIELD WITH GOOD POINTS

The Banker Wind Shield Company has in its No. 2 model De Luxe shield, solved the vexatious problem of producing a clear vision shield with no metal strips across the glass to obstruct the driver's view of the road by using brass channeled shelves which extend from the frame to support the glass. At the same time by the setting of the upper glass fold one-quarter of an inch lower and forward of the lower glass fold, it absolutely prevents any possibility of rain, wind or dust coming through. By the use of adjustable telescoping rods, which are easily operated from the seat, any angle desired may be obtained in connection with ball ratchet hinges. The double fold over the hood is obtained by means of an expander placed inside the telescoping rods, and fitted at the end with a knurled wheel that tightens or releases the tension instantly in raising or lowering the shield. A slight pressure of the hand on any part of the frame will put the shield at any desired angle.